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The first case of rabies that was recognized in America occurred in Boston in 1768.

In small animal practice, a combination of a bland oil and ether given as an enema may be used as an anesthetic.

Laymen have failed in the vaccination of hogs largely because of their inability to recognize the symptoms of disease.—R. A. Craig.

The principal causes of losses in recently hatched chicks are improper incubation and brooding, deficient diet, bacterial infections and parasitic infestation.

It has been demonstrated that sufficient vitamins are obtained in a diet of properly selected foods without the use of specially prepared vitamin foods.

Paratyphoid dysentery in lambs is due to infection but rarely occurs excepting in those lambs that have been deprived of feed for twenty-four hours or longer.—Newsom.

Immunity in rabbits to the *Bacterium avisepticus* by use of an avirulent culture has been demonstrated. In fact, female rabbits that are immunized with an avirulent culture will transmit a high degree of resistance to their young.

The successful removal of the pituitary gland from dogs and the successful transplantation of male sex glands have been accomplished experimentally.—*Science.*

Ergot is one of the most common diseases of rye, wheat, and barley in some sections of the United States. Ergotized grains, hay or straw, is a common cause of ergotism in animals.

It has been found that some protozoa are killed by oxygen. From this principle there may be evolved a method of successfully treating anaplasmosis, piroplasmosis, amebiasis, etc.—*Science.*

It has been demonstrated that dried brewer's yeast contains some essential factor other than vitamin B, and this product may be found of value as a supplemental food in certain diets.

Angora goats, even unruly bucks, can be restrained by grasping and holding the beard. Holding and restraining sheep is accomplished by grasping the fleece, but such practice is injurious to mohair.

B. acidophilus can be implanted into the ceca of chickens by feeding acidophilus milk. Chickens that are fed a diet containing lactose or any skim milk have a degree of resistance to coccidian infection.

According to Fielding, the cock roach (Leucophaea surinamensis) is an intermediate host of the Australian poultry eye worm. Control of this parasitism therefore includes the destruction of the roach.

The longevity of mosquitoes (anopheles) in the summer time varies according to the amount of food they obtain and perhaps on some other factors. However, under ordinary conditions, they live from 20 to 30 days.

Abortion disease of cattle is an infection manifested by one or all of the following conditions: Abortion, retained placental membranes, metritis, mastitis, sterility and in many cases, there is pneumonia and scour in calves.

Eggs from hens that have been fully exposed to sunlight are rich in vitamin A and are of value as an anti-rachitic food. This vitamin has been found to be retained in eggs that were in storage for nine years.—*Science.*

The annual production of 200 million tons of corn stalks and 20 million tons of cobs constitutes a billion dollar waste to the corn grower, according to engineers and chemists who maintain these products can be conserved and converted into 300 useful products.

It has been demonstrated that the daily exposure to the influence of radium reduces both red and white blood cells and diminishes blood pressure and thus seriously interferes with human health. These changes are thought to be due to the action of the radium on bone marrow.

Pig production in the south central states has decreased continuously for the past five years and is now at the lowest point of production in 15 years. There is a splendid opportunity for profitable swine production in the south central states and veterinarians in those states can be of service in stimulating swine production.

Cattle breeders are beginning to appreciate the danger in buying non-reacting cattle from herds in which tuberculosis infection exists, as some non-reactors purchased from infected herds may at a later date, become reactors and cause endless trouble and expense.

The blood serum of cows that have acquired infectious abortion may react strongly to the agglutination test for at least a year after the disappearance of the infection from the udder, as indicated by guinea pig inoculation tests.—Buck & Creech.

Practitioners should not lose sight of the fact that they should be a source of information for their respective communities on the various problems of breeding and feeding of all farm animals as well as treating the ailing and controlling infections.

The successful control of infective diseases is dependent upon a knowledge of the location of the infection in the diseased animal, the avenues through which the infection is eliminated and the avenues through which the infection may gain entrance and produce disease in exposed animals.

There is approximately 186,000,000 acres of grazing land in eleven western states. A considerable portion of this land is in Federal forest reservations. A small fee is charged for grazing privileges in forest reservations.

Canine distemper is the most important and fatal disease of dogs in America. Curs are not as subject to the disease as well-bred dogs. It has been estimated by dog fanciers that 50% of the puppies of some breeds are lost because of distemper.

Growth and development in animals is dependent upon a diet containing vitamins and correctly balanced chemically. Vitamins occur in a wide variety of feeds in sufficient quantities to supply the nutritional demands without the use of artificially prepared vitamin foods.

Excessive losses of poultry is frequently due to overcrowding. Fatal parasitism is prone to occur in fowls that are overcrowded. About 400 chickens can be profitably maintained on one acre if proper housing equipment is provided.

Glucose is of considerable value in acute cases of encephalitis according to L. B. Alford of St. Louis. Over 40 cases of encephalitis has been treated with glucose with splendid results, but unfortunately the report does not give details as to dosage and methods of administration. *Science,* 3-30-28.

Pink eye, strangles, pneumonia and hemorrhagic septicemia separately or in various combinations are the usual diseases of horses and mules incident to shipping. Pink-eye or the old type of so-called influenza, has not been prevalent during the last few years, but diseases resulting from infection with streptococci and *B. bipolaris* have been relatively common. Although the percentage of fatalities is not large, these maladies are of considerable economic importance because of the loss of condition in affected animals.

According to reports there are some losses, particularly of cattle in the southwestern portion of the United States due to wild tobaccos. Tobacco poisoning has probably occurred for many years, but was not recognized as a specific poisoning until recently. The principal symptoms are: trembling, shaking and shivering, staggering gait, staring eyes, salivation and there may be vomition. No treatment of value has been found.

The schneiderian membranes of dogs, rabbits, guinea pigs and man showed no difference in bactericide properties. Of one billion bacteria of seven different kinds sprayed into the nose of each of these animals, 95 per cent were killed in 5 to 7 minutes. The remaining 5 per cent were removed by secretions, gravity, air currents and other mechanical processes, This result was shown in over 250 trials made by the Illinois Department of Health.

Although streptococci culturally and microscopically are apparently identical, there are some streptococci that are specific pathogenically considered. Thus there is apparently a specific streptococcus that produces erysipelas or at least an antitoxin can be prepared that controls that malady by the use of definite strains of streptococci.

It has been estimated that 85% of the corn produced in the United States is consumed by live stock, of which approximately 40% is fed to swine, 20% to horses, 15% to cattle. Feeders have learned that the use of a long continued strictly corn diet even for fattening animals invites trouble.

The experiments of Goldberger and Wheeler apparently demonstrate that black tongue in dogs is of dietary origin and that the condition can be prevented and corrected by the addition of yeast to the diet. The specific substance in yeast that prevents or controls black tongue has not been determined. (*Pub. Health, Repts.* Vol. 43, No. 12.)

In cases of calf pneumonia, good results have followed the use of calf pneumonia bacterins. Especially has such procedure resulted favorably when the organisms causing the infection on the particular farm are used in the bacterin. When pneumonia tends to develop in calves that have recovered from scour, these bacterins should be given as soon as the animals are safely out of danger from the diarrhea.—Hart and Traum.

Once animals are under fence our parasite cycle begins; increased land values call for more and better stock per acre; more stock per acre means more manure per acre; more manure per acre means more parasite material per acre; more parasite material means greater certainty of infection and greater infection per animal; and greater infection per animal means more worm material for any given amount of manure; and this means more infection per acre; and so on.—M. C. Hall.

The Agricultural Appropriation Act of 1929

By John R. Mohler, Washington, D. C.

THE Act making appropriations for the Department of Agriculture for the coming fiscal year, beginning July 1, which was approved by the President on May 16, includes a total appropriation for the Bureau of Animal Industry of $14,585,030. This sum includes a number of increases for promotions and for additional work to be carried on by the Bureau, amounting to $494,965.

Among the increases allowed, there is an item of $199,680 for promotion of veterinarians in the field. This will make it possible to promote many deserving employes, especially in the lower grades, who, on account of lack of funds, have not been promoted for several years and are badly in need of increases in salary. An item of $50,000 is provided for investigational work on the cattle grub. This parasite causes losses in the value of hides, in flesh of animals, and in milk production. The aggregate loss from this pest are tremendous, being estimated at upwards of $55,000,000 per annum. A further increase of $40,000 is made in our appropriation to cover additional investigations on animal parasites in the United States. An increase of $50,000 is provided for extending the meat-inspection service to additional plants, and $10,000 for the inspection of imported animal casings. The sum of $20,000 is included in the increases for investigating the disease anaplasmosis. The sum of $25,000 is included to enable a better and more extended inspection of live stock while in course of interstate transportation to determine whether or not the animals are affected with any contagious diseases. Another item provides $4,185 for eradicating scabies in sheep, principally in Louisiana, Mississippi and Kentucky, where there has been a considerable increase in this disease. The sum of $10,200 is provided to continue investigations into the cause of bacillary white diarrhea in poultry and methods for controlling this most destructive disease. The sum of $7,500 is included for turkey-production investigations at the U. S. Range Live Stock Experiment Station, located at Miles City, Montana, and $5,000 to conduct experiments in poultry nutrition at Beltsville, Maryland, in cooperation with Johns Hopkins University. Another sum of $5,000 is included for the purpose of increasing the facilities of the Poultry Experiment Station at Glendale, Arizona. The sum of $25,000 is specified to enlarge our abattoir at the Beltsville Farm; also $20,830 for the construction of a beef cattle barn and necessary equipment, including pens, silos, etc. There is also an item of $10,070 for the rebuilding of a bridge at the Iberia, La., Experiment Station, which was destroyed during the Mississippi flood. An additional sum of $7,500 is included for miscellaneous pathological investigations, which include research work upon various live stock diseases to determine their causes and the best methods of controlling and eradicating them. Likewise $5,000 is added in order to enable a survey to be made of the extent of loco plants in the Southwest with the view of formulating a definite method of exterminating this weed in order to abate the serious losses which now occur among live stock from eating it.

With the additional appropriations provided by Congress the Bureau of Animal Industry hopes to accomplish even greater results than have so far been achieved in its endeavor to better live stock conditions and to aid producers in securing larger returns from the sale of their animals and animal products.

A Practitioner Speaks Up

By OBSERVER

"I see where the Deans of the various colleges is raisin' Cain 'cause there ain't more students in attendance at their founts of knowledge. This makes a poor showing when it comes time for them to go before a rough-necked legislature and holler for more appropriations," began the Old Practitioner.

"Fact is," as the late President Adams of the A. V. M. A. said, "we have all the veterinary students necessary. Take our county, for example, and let me tell you what conditions really are. Same thing exists all over the country, only in some a little worse, and in others, some better.

"Twenty years ago when I came here just out of college, there were eight practicing veterinarians in this county. All were making a good living. Mud roads eight months in the year. Took all day to make three calls. Kept two teams and the whole family busy looking after them. Every farmer was trying to make an honest living. Land was around $50 to $100 an acre, and taxes in proportion. Calls were fifty cents a mile. Some professor of economics has asserted the present day dollar is only worth 68 cents, but I won't go into that phase of the subject. It makes my head ache. Let us just discuss why practice has been shot to pieces the past few years.

"First of all, I would place misguided agricultural education. Each department in the college tries to outdo the other. The veterinary department is always a popular one, because every farmer boy imagines he is a natural born doctor.

"Now the fundamental idea is giving the agricultural student a foundation of veterinary science is all right. Taking care of minor ailments and being able to nurse them; rendering first aid in emergency cases such as bloat or severe hemorrhages; being able to discuss sanitation and hygienic methods of disease control is commendable. But were the professors satisfied with that? As to some of them the answer is decidedly No!

"Pretty soon the agricultural graduate began to think he knew as much about veterinary science as a regular veterinary graduate. He began to 'bootleg' practice. He bought himself a hypo; he vaccinated everything that could be vaccinated; he butted in on his neighbor's sick stock, and thought he knew all about obstetrics. In fact, he only reluctantly recommended calling in a veterinarian after he had ruined the case. He took the place of the old time quack, without knowing as much as real experience can teach one after years of practice.

"This shows a lack of teaching ethics by some men in our colleges. It shows a smattering of everything taught in our agricultural curriculum, until the average graduate thinks he is a wizard at everything. When an animal husbandry graduate thinks he knows more about dairying than a dairy graduate; when a man majoring in horticulture thinks he knows more about doctoring stock than a graduate veterinarian, there is something wrong with our present system of education. No wonder there are so many failures among our college graduates.

"We all have our limitations. Even though I have been out of college and actively engaged in practice for twenty years, there are branches of veterinary science that I know very little about. I am not an expert meat inspector; nor could I pose as a pathological sharp in the manufacture of biologicals or in research. I have had no experience in teaching, and know nothing of that line of work. But in the line of practice, I do claim to know something after all my years' experience. I can go out in a snowstorm and treat a case of azoturia or pneumonia, or perform a surgical oper-

ation and usually get results pleasing to my client. If, after twenty years of veterinary experience, I do not claim to know all about the different branches of my profession, why should an agricultural graduate who has been exposed to a three-hour course for nine months claim to know it all?

"Next came county agents. In some cases they really are a benefit to the community. They have helped to place the live stock industry on a firm foundation. They fostered weed control. They sought markets. They left private interests strictly alone, and worked with them instead of against them. But with others, what happened? They busted right into cholera vaccination; they tried to make a big showing on buying stuff cheaper than the local merchants. Of course, even if the local merchant did have to wait a year for his money, and then never get all, made no difference to them. In bad years, the farmer let his veterinary bills go for a year or more, but when he bought anything from the county agent it was strictly cash. But why continue? You know the whole story!

"Federal veterinarians began to practice so much on the side that the government had to make a stringent rule against this. Veterinarians from the extension department of colleges roamed around over the state on the tax payer's money giving instructions on how to vaccinate, and how to get along without ever calling the local veterinarian. Commercial firms, headed by graduate, registered veterinarians, in some instances forgot their ethics in dollar chasing and became traitors to their profession. The Federal government issued hundreds of bulletins on treating live stock, without so much as mentioning the fact that the local veterinarian might be able to assist if consulted.

"Watkins and Raleigh agents made their regular rounds. Every hardware store, blacksmith shop and country grocery stocked up on Balsam of Myrrh, Absorbine and all other kinds of medicines, good for anything at anytime. So-called ethical firms sold blackleg vaccine cheaper to stockmen than practitioners could purchase it.

"Next came farm bureaus. Largely run by agricultural college graduates who unable to make a living off the farm, proceeded to make a living off the farmer. With a great ballyhoo on how they just ached and yearned to help the downtrodden farmer, they launched campaigns that hurt every business man in town.

"Then came the war, and thousands thought that two-dollar wheat and twenty cent hogs were here to stay, so they began to buy land. $500 an acre was a common price paid—mostly in notes and mortgages. They only raised their assessed valuation and taxes, for land will produce only so much, whether priced at a hundred or five hundred dollars per acre. We all know the pitiful results. Thousands of hard working, honest, but misguided farmers lost everything; their life savings; their old, highly treasured home farm. They became embittered. Right now, there are thousands of men farming on rented places, who could be arrested for what they think about things.

"Politicians took advantage of this condition and made propaganda out of it. You know and I know that governmental supervision can never help avoiding distress due to speculation. But that has gone and it is no use to worry about it. We all know that hundreds of banks went 'flooey,' and depositors lost their entire wad. Out west, sheep men dropped out of the race, ruined in less than a year. A man could be worth a hundred thousand today, and in six months he was working for wages.

"Tractors and autos have not hurt practice to speak of. They have increased production, and really made more work for the practitioner. True, in some communities, equine practice is not now what it was once, but this is not a horse age. This is a mechanical era, and the quicker we appreciate it the better. What has hurt veterinary practice has been the

wave of free advice, free services, and free interference with the legitimate practitioner.

"What has been the result? Of the eight veterinarians we had in the county, prospering years ago, we have three left. Only one of these, located in the county seat and surrounded by a rich dairy country, is making slightly more than a living. The other five have died, moved away or gone into other lines of work. When they found that a very ordinary garage mechanic, who barely knows a monkey wrench from a sledge hammer making more than a man in practice, they quit.

"One of these days the stock owner will find out a lot of things. When epizootics begin to sweep over his flocks and herds and there are not enough men to control it, who is to blame? Who helped to bite the hand that fed him? I'm not going to worry. Let him do that. He has not been worrying about me, and cared nothing for my professional attainments. At best, he only regarded me as a necessary nuisance.

"If my boy were to come to me and even hint about entering a veterinary college the way things are now, I would have him examined by an alienist. I would have his skull x-rayed to see if it was solid bone. I would sit down by his innocent, optimistic side, and spend a quiet hour talking with him. Then, if he still yearned to be a vet, I would sadly bid him goodbye. I would tell him to listen to the lectures and class room spiels on professional ethics, and altruistic ideas, and write them all down. Then, after he was out of school five years, compare these notes and what I told him, and see which was true!

"But things come in cycles, like Democrats and grasshoppers. If we live long enough, we will see practice swing back to where it belongs. People have got to have milk and butter and meat and wool and preachers have got to have chicken, and disease control will swing back to the qualified man. Just as our forefathers had to get along without radios and airplanes and daily newspapers, and the younger set of their day had to live without Ford bugs or bobbed hair, so our generation of veterinarians will have to endure the privations of the present cycle of metamorphosis, what ever that means."

But the phone rang and The Old Practioner answered:

"Yes; all right; I'll be down in a few minutes." The rain was blowing a gale, but we could hear the old car chugging through the mud as he hastened on his call.

Jack, eldest son of Dr. H. A. McIntire, Maquoketa, Iowa, and a tailless, three-legged calf, the fruit of one of the doctor's obstetric cases.

The achievements of chemists in synthesizing complex organic compounds is of great scientific and economic importance. Rose and Cox have demonstrated that a synthetic product devoid of an amino group can be substituted for histidin, a protein building material that had previously been considered essential for the growth and development of man and animals. If the histidin substitute prepared by Rose and Cox can be produced economically in sufficient quantities, it will simplify the feeding problem.—*Science*, No. 1625.

Santonin Inferior to Oil of Chenopodiun as an Anthelmintic for Swine

By G. H. CONN, Freeport, Illinois

THERE has been an extensive use made of worm expellers for swine for many years. The use of such products by many swine owners has become an established custom. Since the "McLean County System" of swine production has been perfected, many swine producers have adopted this method.

The swine owner using a product for expelling worms from his swine herd, is dependent entirely upon the visible evidence of the results of such a treatment. If the treated animals passed a number of worms after receiving the treatment, the owner was of the opinion that it was satisfactory.

Veterinarians have also depended largely upon the visible evidence of the results secured from the use of a worm expeller or remedy; they do not have sufficient time to conduct controlled experiments, therefore have not been in a position to question the effectiveness of some so-called worm expellers.

Many drugs and chemicals have been used and recommended as worm expellers; but controlled tests of the most common ones, followed by slaughter and examination of the intestinal tract, has shown that there are but two of general effectiveness. These two preparations are santonin and oil of chenopodium.

Many other preparations, which have been highly recommended by different veterinarians and swine producers, have been found, when submitted to a carefully controlled test, to be ineffective.

That the reader may understand just why a product may be recommended as an efficient worm expeller, without actually being one, attention is directed to the following quotations from an article by Dr. Jacob E. Shillinger of the Zoological Division, Bureau of Animal Industry, entitled "Anthelmintic Properties of Santonin." This article appeared in the *Journal of Agricultural Research* on May 1st, 1927. The quotations are as follows:

"In the world of therapeutics certain drugs or preparations have been used for so many years that the statements in the literature, especially in the textbooks and also in articles in professional journals, as to the action of these drugs have a tendency to reiterate impressionistic ideas or traditions. Printed statements are ordinarily copied and passed on with little or no attempt to substantiate the claims made. With a widespread impression once established, it is difficult to revise opinions with regard to drugs and a writer is placed in a precarious position if his results conflict with the generally accepted view.

Wide Variations in Methods of Administration

"Santonin is one of the drugs having an extensive traditional reputation as an anthelmintic. Its use and results have been varied in the hands of the users as reported by them. After many years of use, the method of administration and the dosage of the drug still show wide variations. It is recommended by some persons who have used it as valuable in single dose treatments, and by others as valuable only in divided doses continued over a considerable period. By some it is administered alone as a pure drug and by others combined with one or more substances said to have synergistic value.

Some administer santonin simultaneously with a purgative; others regard this as bad practice and prefer to follow with a purgative several hours after administration, while still others give a purgative both preceding and following the drug. The type of

purgative advised is not a matter of uniform opinion, and various substances, such as salines, oils, calomel and arecolin, have been advocated. Some believe that feed should be withheld from the subject preceding the treatment, while others make no such provision; some administer the preparation mixed in the feed, while others claim that this procedure gives very poor results. Certain workers insist on the necessity of individual treatments, while another group advises its use in flock treatments.

"The great safety of santonin has repeatedly been referred to as one of the outstanding qualities of the drug. This is a factor of considerable importance when it is necessary to treat very young or weak animals for intestinal parasitism. However, to be useful, an anthelmintic must combine a fair degree of efficacy and cheapness with reasonable safety.

"A consideration of the writings of various workers shows a considerable divergence of opinion as to the value of santonin. The difference of opinion arises in large part from the fact that no uniform method of testing the drug has been used by investigators and that in only a few cases have accurate counts been made of the worms passed and a critical evaluation made of the results as ascertained by post-mortem examination of the animals treated."

Source of Santonin

Santonin is a crystalline chemical derived from Santonica, the unexpanded flower heads of *Artemisia cina*. These plants are also known as Levant worm seed, and grow wild on the steppes of Russian Turkestan. This product has been in use for about a century; while it has enjoyed a very wide use, it is evident from late experimenters' work that it is a very much over-rated drug.

This plant is now being grown in the United States and is found to thrive in many desert areas. It is thought that within a few years, a domestic production of this chemical will be sufficient to meet the demands in the United States.

This discussion in dealing with the relative efficacy of these two worm expellers will quote principally from experts who have made controlled experiments with both of them, under identical conditions. Therefore, there can be no question as to the soundness of the conclusions reached by these investigators.

Source of Oil of Chenopodium

Oil of chenopodium is distilled from the entire plant known as American worm seed or Jerusalem oak. This plant grows wild in many sections of the South but is raised extensively in Carroll County, Maryland; several hundred acres being planted to this crop every year. These plants are cut and allowed to cure for two or three days, after which they are placed in a large still and steam distilled. The oil is light orange in color and has an irritating odor. It has been of great value in the treatment of hook worm in people. It is also of great value as a worm expeller for swine.

Experimental Work

Professor Don C. Mote, formerly Parasitologist to the Ohio Agricultural Experiment Station, conducted a large number of experiments from 1913 to 1918 which are reported in Bulletin No. 378 of that station; entitled "Anthelmintic Experiments with Hogs." In summing up his conclusions regarding the efficiency of the different worm expellers used in this experiment, Professor Mote says:

"Santonin seldom fails to remove ascarids from hogs, and it is more efficacious in repeated doses. However, it does not appear to be as highly efficacious as is sometimes claimed. In the fifteen tests in which santonin was used, its efficacy ranged from 0% to 46.6%. The combination of santonin, calomel, areca nut and sodium bicarbonate likewise proved to be less effective than the claims made for it. Probably the statements regarding the effectivenes of this formula as well as that of santonin alone are based upon the number of worms observed in the pens after dosage, with no attempt to determine whether the treated animals are still infested.

"The most effective remedy was oil of chenopodium. The administration of this drug, when preceded by a fast and administered orally, in conjunction with castor oil, proved 100% effective. On the other hand, the drug does not appear to be effective when administered upon a full stomach, nor

is its administration in the feed satisfactory or effective. It appears necessary, therefore, in order to get the best results from chenopodium, to administer it to each pig individually, in suitable dosage, preceded by a fast. In treating such an unruly animal as the hog this method involves not only considerable labor, but also some danger of strangling. However, the labor and danger of strangling the animal may be considerably reduced by the use of a dosing syringe and a device for holding the animal's mouth open during the operation. Other measures of reducing the labor, such as separating the animals to be treated into pens roughly according to weight will suggest themselves to the operator.

"Among the drugs and combinations which gave evidence of having some anthelmintic efficiency against ascarids in hogs under experimental conditions, the following may be mentioned in order of their efficacy:

1. Oil of chenopodium.
2. Santonin.
3. Santonin and calomel.
4. Santonin, calomel and sodium bicarbonate.
5. Santonin, calomel, areca nut and sodium bicarbonate."

Dr. Jacob E. Shillinger in a paper entitled "Anthelmintic Properties of Santonin," published in the May 1st, 1927, issue of *Journal of Agricultural Research,* makes the following statements:

"Two pigs weighing 78 and 81 pounds, respectively, were given 5 grains of santonon each in a light feed after having fasted for 12 hours. Six days later, this treatment was repeated. It was not feasible to examine the feces of these animals, but on postmortem examination 15 ascarids were found in one and 68 ascarids in the other. The dosing of the animals by mixing the medicinal agent with the feed has never been regarded as an economical or scientific method of treatment by the skilled veterinarian. Certainly in most cases, the efficacy of the drug is lowered by the process.

"Following this test three pigs, each weighing between 30 and 40 pounds, were given capsules containing 5 grains of santonin after they had fasted for 24 hours. This was administered in the evening and on the following morning, about 15 hours later, and two hours before the regular mash feed was given, a small quantity of mill feed saturated with water in which 5 ounces of Epsom salt had been dissolved was given them. Purgation resulted and 4 ascarids (round worms) were passed during the next two days. Post mortem examination of the animals one week later showed 59, 8 and 37 ascarids (round worms) respectively.

"One animal weighing 45 pounds, which had fasted 24 hours, was then given 6 grains of santonin in a capsule, followed in 12 hours with a purge of Epsom salt. Two ascarids (round worms) were passed following the treatment. Post-mortem examination of the animal on the sixth day showed 45 ascarids (round worms) present.

"To another animal weighing 36 pounds which had fasted 24 hours, a dose of 15 grains of santonin in capsule was administered, followed immediately by 10 grains of calomel. The animal passed 16 worms during the three succeeding days. Post-mortem examination the seventh day showed four ascarids (round worms) in the small intestine.

Summary of Tests on Swine

"Summarizing the santonin tests on swine, it may be stated that the dosage of 5 grains in feed was of little or no value. While there is a possibility that some worms were passed, the retention of 15 and 68 worms after treatment is sufficient to condemn either the drug or the method of administration. Santonin administered in 5-grain doses to animals weighing 30 to 40 pounds, after they had fasted 24 hours, followed by a purge in 15 hours, removed 4 worms from a lot of three pigs and left an aggregate of 104 in the lot. A dose of 6 grains administered after a fast of 24 hours and followed in 12 hours by a purge of Epsom salt proved insufficient for a 45-pound animal, removing only 2 of the 48 worms present. A dose of 15 grains accompanied by 10 grains of calomel administered to a 36-pound pig which had fasted 24 hours proved most effective, removing 16 of the 20 worms present in the animal.

Santonin Advertising Misleading

"The findings reported by Hall and Foster that santonin in single doses of from 1 to 3 grains gave about 24 per cent efficacy in removing ascarids from dogs, and those of Mote to the effect that a value of 0% to 46% appears to be within the actual range of utility for the drug in removing ascarids from swine, are in substantial agreement with the findings reported in this paper. All critical testing of which the writer is aware shows an anthelmintic value for santonin much below what has been and is now being claimed for it in advertisements and in papers based on impressions gathered solely from seeing worms passed. If accurate data were obtained on the value of santonin as an anthelmintic by systematic post-mortem examination of test animals, much of the misinformation concerning its value could be eliminated.

"The ease of administration of santonin is an advantage and may tend to prejudice the minds of users against other drugs more difficult to use in favor of santonin, and while it has value, especially in repeated treatments, it is a very much overrated drug at present. In the opinion of the writer, its value is principally that of a drug which does not cause irritation of the gastro intestinal tract and hence is of value for use in repeated doses in cases of gastroenteritis with ascariasis, or in repeated doses for removing whipworms."

Dr. Maurice C. Hall, Chief of the Zoological Division, Bureau of Animal Industry, U. S. Department of Agriculture, and Winthrop E. Foster, in a paper entitled "Efficacy of Some Anthelmintics," which appeared in the *Journal of Agricultural Research,* February 18, 1918, have this to say about Santonin:

"Before the present World War, when the price of santonin justified its use for live stock, it was much recommended for roundworms (*Ascaris suum*) in swine. Since the separate dosing of a herd of swine requires considerable time and labor and the handling of the animals is likely to excite them and may lead to their being injured, it is usually the custom to mix the medicine with the feed, allowing a few hogs to eat from the same trough at one time. If the drug is well mixed with the feed and the animals are of about the same size, it is assumed that they will get approximately the same dose. This method was tested by the junior writer for a number of drugs. In this series of experiments, the worms passed were not counted; nor were the animals killed. The feces were previously examined for ascarid eggs and the efficacy of the drug was estimated by a comparison of the number of eggs in the feces three days after the administration of the anthelmintic, care being taken to verify all negative findings by one or more repeated fecal examination at 3-day intervals.

"In the first experiment, after a preliminary fast of 24 hours, three hogs weighing 15.4 to 18 kgm. (34 to 40 lbs.) were given santonin and calomel allowing 130 mgm. (2 grains) of each per hog. The drug was shaken up in 473 mils of water, poured over a bran-mash feed and thoroughly stirred in. The feces of all the pigs were positive for ascarids (*Ascaris suum* or *suilla*) at the beginning of the experiment. Three days after the treatment the feces of all the pigs were still positive. As the treatment failed to free any of the pigs from ascarids (*A. suum*), it was repeated, giving 194 mgm. (3 grains) of santonin and calomel instead of 130 mgm. (2 grains). The second treatment was equally without results. A third trial was made in which the pigs were dosed individually after preliminary starvation, each pig receiving 194 mgm. (3 grains) each of santonin and calomel. This treatment resulted in the apparent elimination of all ascarids from one of the pigs, the other two remaining infested. These hogs were then dosed individually with 259 mgm. (4 grains) each of santonin and calomel, all subsequent fecal examinations being negative.

"It appears from the above that santonin and calomel should be given in repeated and separate doses to be effective. Probably three doses of santonin at intervals of three days would be effective. No symptoms of poisoning were observed either in dogs or pigs, although the pigs were given a dose

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more than twice as large as is usually prescribed for animals of their size. According to the Veterinary College at Ames, Iowa, not over 4 grains (259 mgm.) of santonin should be given to the largest hog. It would seem that the treatment of swine with santonin requiring apparently three separate doses to be effective, is far too laborious and costly for use, especially as we have a more reliable and less expensive drug in oil of chenopodium.

Santonin and Areca Nut for Worms in Hogs Complete Failure

Combinations of santonin and areca nut are frequently prescribed for pigs, to be mixed with the feed. The following, copied from the Breeder's Gazette, is typical:

Santonin .....2½ grains.
Areca nut .....1 dram.
Calomel .....½ grain.
Sodium bicarbonate .....½ dram.

"This quantity is considered sufficient for a 100-pound hog. As the pigs experimented with weighed only 24.5 kgm. (54 lbs.) each, two-thirds of the amount prescribed was allowed for each pig and mixed with the feed, after starving the animals 24 hours. Three days after the experiment the feces were still positive for *Ascaris suum*, and a second trial was made using the full amount prescribed in the formula. This experiment was also unsuccessful in ridding any of the hogs of ascarids. A third trial of the formula was made on a pig weighing 24.5 kgm. (54 lbs.) with the object of testing the efficacy of repeated doses. Five times the amount prescribed was made up and divided into seven powders, one powder being mixed with the feed every morning for seven consecutive days. At the end of the period no diminution in the number of ascarid eggs in the feces was discernible.

"As far as these experiments can be analyzed it appears that santonin and areca nut offer no advantages over santonin and calomel, and that either combination must be repeated and given in individual doses on an empty stomach to be efficacious. The last experiment illustrates the inadvisability of giving drugs to hogs, mixed with the feed, since in this case, a drug already shown to be efficacious in repeated doses was apparently a complete failure when given in this manner."

Santonin's Reputation Undeserved

Dr. Maurice C. Hall, further writes in his Diagnosis and Treatment of Internal Parasites, published in 1923, concerning santonin as follows:

"Santonin has for many years enjoyed the reputation of being the best ascaricide known, but critical tests show that in single therapeutic dose, it is distinctly inferior to chenopodium for removing ascarids from dogs and swine. To develop its greatest efficacy it must be given in small doses repeated daily, and given in this way it appears to exert a cumulative action on the worms and is quite effective, a smaller total being more effective than a single dose larger than this total. Santonin and calomel, equal amounts, in doses of four to eight grains each, are commonly recommended for removing ascarids from swine, but chenopodium is better."

The above quotations have been taken from published papers and literature by these experimental workers, and no question can be raised as to their being unbiased in their experimental work. The following conclusions were reached by these same experimenters with reference to oil of chenopodium for swine.

Professor Don C. Mote in bulletin 378, of the Ohio Agricultural Experiment Station, writes as follows: (This quotation is taken from the same conclusions that Professor Mote reached with reference to the Anthelmintic Experiments continuing over a period of five years, at the Ohio station.)

"The most effective remedy was oil of chenopodium. The administration of this drug, when preceded by a fast and administered orally, in conjunction with castor oil, proved 100 per cent effective. On the other hand, the drug does not appear to be effective when administered upon a full stomach, nor is its administration in the feed satisfactory or effective. It appears necessary, therefore, in order to get the best results from chenopodium, to administer it to each

pig individually in suitable dosage, preceded by a fast. In treating such an unruly animal, this method involves not only considerable labor but also some danger of strangling the pig. However, the labor and the danger of strangling the animal may be considerably reduced through the use of a dosing syringe and a device for holding the animal's mouth open during the operation. Other measures of reducing the labor, such as separating the animals to be treated, into pens roughly according to weight, will suggest themselves to the operator.

"Among the drugs and combinations, which gave evidence of having some anthelmintic efficiency against ascarids in hogs under experimental conditions, the following may be mentioned in order of their efficacy:

1. Oil of chenopodium.
2. Santonin.
3. Santonin and calomel.
4. Santonin, calomel, and sodium bicarbonate.
5. Santonin, calomel, areca nut, and sodium bicarbonate."

Drs. Hall and Foster in their papers, "Efficacy of some Anthelmintics," form their conclusions concerning santonin, also with reference to oil of chenopodium.

"A series of experiments to test oil of chenopodium as an anthelmintic for ascarids in swine were carried out by the junior writer and seemed to indicate the great value of this drug when given to hogs individually after a period of starvation. In these experiments the hogs were not killed, the effect of the anthelmintic being judged by the presence or absence of ascarid eggs in the feces passed subsequent to treatment.

"In the first experiment with chenopodium, an effort was made to determine the minimum effective dose necessary to free a hog from ascarids. In this case the dose periments, the hogs were not killed, the ef- of oil was combined with 3.7 mils of areca nut and mixed with the feed, after starving the pigs. Each pig was fed separately, thus assuring full dosage to each animal. Two were given 0.2 mil of chenopodium, while a third pig weighing 37.9 kgm. (71 lbs.) received 0.4 mil. This latter pig was apparently free from ascarids after a single dose, while the other two pigs each received three additional doses of 0.27 mil, 0.36 mil, and 0.54 mil before their feces were negative for ascarid eggs. (A mil is about 15 minims or drops.)

(Note:—When these experiments were being made there was little known about the dosage of oil of chenopodium, therefore it was given in much smaller doses than are now being used.)

"It is evident from the above, that even when given mixed with feed, a method later shown to be unsuitable, a relatively small dose of oil of chenopodium may prove efficacious. It should be stated in comment that at the time these experiments were conducted, there was little modern literature in regard to the use of oil of chenopodium, and, so far as the writer is aware, no use has been made of the oil as an anthelmintic for swine. Hence, the drug was administered cautiously. Subsequent experiments have shown that doses of chenopodium relatively many times larger are perfectly well tolerated by swine and are more certain in action.

Chenopodium Highly Efficacious

"In a second experiment with swine, chenopodium was administered in castor oil, and was not given mixed with feed, but was fed with a spoon to each hog individually. Four of the five hogs used were each given 28.35 gm. (nearly an ounce) of Epsom salt mixed with their feed, while the fifth hog was given none. All animals were then starved for 24 hours before the administration of the chenopodium. The smallest pig, weighing 12.25 kgm. (27 lbs.) was given 0.8 mil; the others, weighing 12.7 (28 lbs.) to 28.12 (65 lbs.) were given 1 mil. The dose of chenopodium in each case was given with 29.57 mils (1 ounce) of castor oil. This treatment was entirely successful. All five hogs had shown numbers of ascarid eggs in their feces prior to the treatment, and all were found free from ascarid eggs a week later. The feces of the hogs were again examined three days later and found negative. Two of the five hogs received a third fecal examination, which was consistently negative.

"It appears from the above that chenopodium is an excellent anthelmintic when given in individual doses after preliminary starvation, and in most cases may be relied on to remove all the ascarid worms present. This opinion was confirmed by further experiments. The preliminary dosing with Epsom salt did not seem to be of any benefit, since the chenopodium was as successful in the case of the hog which received no salt as in the case of those that did. Subsequent experience has shown that in the chenopodium treatment for hogs, preliminary purgation is an unnecessary expense.

Anthelmintics Mixed with Feed

"As there is always a demand among stockmen for something that can be mixed with the feed to rid their hogs of worms, an experiment was undertaken to determine the possibilities of this form of medication. As hogs, especially if large, are very difficult to handle and as much time and effort would be required to dose separately each animal of a large herd, the advantage of mixing the medicine in the feed is obvious. Unfortunately, this method proved impracticable, as shown by the following experiment.

"One mil of chenopodium, 29.57 mils (1 ounce) of castor oil, and 237 mils (8 ounces) of linseed decoction made by boiling 113 gm. (3½ ounces of linseed in 296 mils (9 ounces) of water, were thoroughly shaken together into a homogeneous emulsion. This amount was allowed for each of four hogs weighing 20.4 to 32.2 kgm. (45 to 71 lbs). The emulsion was distributed evenly through a bran mash which all four hogs ate together. The animals had previously been fed a mash containing Epsom salt at the rate of 28.35 gm. (nearly an ounce) for each animal, then starved for 24 hours before treatment. The fecal examination a few days after the treatment showed that one hog was freed from ascarids, the three others still remaining infested.

"It is evident that the administration of drugs by mixing them with the feed is a method which gives little promise of success, and the far greater efficacy achieved when the drug is given individually after a fast more than compensates for the extra labor involved.

"In order to be certain that the comparative failure in this treatment resulted from the method of administration and not from an insufficient dose of chenopodium the experiment was repeated, allowing 2.5 mils of oil to each of the three hogs remaining infested. This experiment resulted in a total failure, all the hogs remaining infested after the experiment.

"The above experiments were concerned solely with the action of chenopodium against ascarids, no attention being paid to its action on other intestinal parasites. In order to test its action on nodular worms (*Esophagostomum dentatum*) three doses of oil of chenopodium were given to one hog at intervals of 10 days, two fecal examinations being made after each dose. The chenopodium was given with 3.7 mils of areca nut after preliminary starvation, and, so far as could be judged from the fecal examinations, there was no diminution in the number of nodular worms. On account of their location in the cecum and colon, where they are protected by a large mass of fecal material, it is not surprising that a vermifuge given by the mouth has little or no effect upon nodular worms. The extensive colon of the pig is rarely, if ever, approximately empty, even after prolonged starvation. Probably the best way to reach worms in this location is by the use of diluted anthelmintics in the form of enamata, as suggested by Railliet (1915).

Oil of Chenopodium the Most Reliable Anthelmintic

"The following experiments with chenopodium, in which the hogs were subsequently killed and all worms counted, confirmed the writers' opinion regarding the efficacy of oil of chenopodium when given under suitable conditions:

"Two pigs weighing 8.16 (18 lbs.) and 14.06 kgm (31 lbs.) respectively, were given 1 mil (15 drops) of oil of chenopodium, while a third, weighing 9.98 kgm (22 lbs.) was given 2 mils (30 drops). The drug was followed by 59 mils (2 ounces) of castor oil in the case of one pig and given in 59 mils of castor oil in the case of the second pig. Eleven ascarids and six nodular worms

were passed by the hogs. Post-mortem examination showed that all animals were freed from ascarids (*Ascaris suum*), while numerous nodular worms (*Esophagostomum dentatum*) were found in each animal. The experiment adds further proof of the efficacy of oil of chenopodium as an ascaricide, and demonstrates that it also has some efficacy for nodular worms, although probably only a few were removed. As already stated, these worms are so protected by the large amount of fecal material in which they lie that it is unlikely that any anthelmintic given by the mouth will have much effect upon them.

"The most reliable vermifuge for ascarids, whether in dogs or swine, is oil of chenopodium. This drug, which was tested out on 34 dogs in six experiments, showed an efficacy for the entire series of 97 per cent. It rarely fails to remove all the ascarids present in a dog if given at the rate of 0.2 mil per kilo (a kilo is 2.2 lbs.) preceded by a dose of castor oil and the animal starved for 24 hours before treatment.

"The chenopodium is also very efficacious for ascarids in swine, and when properly administered may be expected to remove most, if not all, of the worms present. It would seem, however, that neither chenopodium nor any other drug tested will give satisfactory results if mixed with the daily ration and the animals allowed to dose themselves; it is best given to each pig individually in suitable dosage, preceded by a fast. While this method necessarily involves considerable labor when treating animals as unruly as swine, the labor can be reduced by sorting the hogs roughly into classes according to size and confining them in inclosures which will permit them to be caught with a minimum amount of struggling. The treatment has proved practical on a large scale and the results, as far as they could be determined, were entirely satisfactory.

"Among the drugs which have given the best results under experimental conditions for the purposes intended and concerning which the writers have sufficient data to warrant positive conclusions may be mentioned the following:

"Oil of chenopodium for ascarids in pigs and dogs."

Dr. Maurice C. Hall, after further experiments with oil of chenopodium for removing ascarids (round worms) from swine in "Diagnosis and Treatment of Internal Parasites," published in 1923, under treatment for swine parasites says:

"*Ascarids:* Fast 24, preferably 36, hours. Oil of chenopodium one fluid dram (3.75 cc.) in or immediately preceded or followed by two fluid ounces (64 cc.) of castor oil for animals weighing 100 pounds (45 kilos). Diminish dose of chenopodium for small animals in proportion to weight, but use at least one ounce of castor oil; for larger animals the dose of castor oil should be increased, up to four ounces for very large animals. Chenopodium requires adequate purgation to offset its constipating and toxic action. In default of castor oil, which is bulky, it has been suggested that salts be given in soft feed of some sort three hours after treatment; no reports on the results of such treatment are available. Worms pass for two days. Efficacy, approximately 100 per cent."

Conclusion

A careful study of the conclusions reached by these several investigators who conducted controlled experiments, with reference to the value of santonin and oil of chenopodium as worm expellers for swine can not be considered other than conclusive. In practically all of these tests oil of chenopodium was shown distinctly superior to santonin as a worm expeller for swine. While santonin has been highly recommended and been used for many years, for this purpose, it has not shown a high efficiency in any of these tests. Since these tests have been conducted over a period of nearly 14 years, and by several different investigators, working independently, but along similar lines, it is evident that there can be no question as to the accuracy of the results. The santonin used in these experiments has been tested for purity and the methods used have been similar to those recommended by the producers of santonin.

Osteomalacia In Cattle*

By R. A. McINTOSH, Guelph, Ontario

During the past year a number of practicing veterinarians in the province have reported a condition of a rheumatic character affecting more particularly milk cows. In describing the disease mention is usually made that these animals at first have a depraved appetite and will lick at and eat foreign material, such as sticks, bones, and decomposing foodstuffs. They gradually lose flesh, their appetite grows more capricious, they stiffen up, become lame and reluctant about moving, and, in some instances, go down and are unable to get up without assistance. By further inquiry it was learned that the districts in which the disease is most prevalent, have for the greater part sandy soils. Such soils are frequently lacking in elements required for the growth of bone and the process of metabolism in the body as a whole. Animals pastured on forage grown on soil of this character, or fed on foodstuffs produced on it, will more frequently manifest diseases in which there is an interference with metabolism than those which are fed on food produced from soil in which there is a greater percentage of calcium and phosphorus. The history of these cases, together with the symptoms described, indicates a disease in which there is a nutritional deficiency such as occurs in osteomalacia.

The term Osteomalacia means bone softening. It is a disease arising from general nutritional disturbances, which causes an increased absorption of lime salts from the bones and substitution of the liquefied bone tissue by osteoid tissue, from which softening, sometimes crumbling, and occasionally fractures, may occur.

This disease is most frequently seen in cattle, especially milk cows, although it does occur in other animals. It is more prevalent in districts and regions with unfavorable soil conditions and more particularly in dry years. In some countries with the occurrence of a dry year, it assumes enzootic proportions and is the cause of considerable loss in cattle.

Etiology. Osteomalacia is caused by calcium and phosphoric acid deficiency in the body. This statement is supported by the occurrence of the disease in regions where it is known that these elements are lacking in the soil. Plants and grasses growing on such soils are poor in minerals especially in dry years when the salts in the upper layers of the earth are not properly dissolved and in that way are not available for plant assimilation. Furthermore, a calcium and phosphorus deficiency may occur as a result of improper methods of feeding. If animals are fed continuously with feeds which naturally contain but little of these elements there is a possibility of the disease occurring in them. This is especially true in pregnant cows, for during this period they are required to supply an extraordinary amount of these nutritional elements for the development and growth of the fetus. Long continued digestive disturbances may give rise to a similar form of disease but as a rule can be successfully differentiated. Some writers have attributed trophoneurotic disturbances as having a causal relation to this disease. Others have investigated it with the belief that the disease had an infectious origin. It is more likely that these are secondary phenomena rather than being the primary causes, for nutritional deficiency lowers vital resistance and increases susceptibility to other forms of disease.

Pathogenesis and Anatomical Changes. The calcium content of bony structures is largely responsible for their solidity. When calcium is wanting in the body a

* Report of the Ontario Veterinary College.

resorption of that element from the bones takes place. Larger amounts of calcium are required by animals during the growing periods of their life, during pregnancy and during lactation and it is at these times the disease is most commonly manifested. The need of this element is felt by the body and leads to the depravity of appetite seen in the disease. Abstraction of calcium from the bones takes place from within outwards, that is, from the marrow canals to the surface. Decrease in the solidity of the bones goes hand in hand with the increase of irritation from body movements. The affected animal is reluctant about moving and manifests lameness. As the disease progresses those areas of the bones where tendinous, ligament and muscular attachments take place, tend to enlarge by the formation of limeless bone tissue resulting in the condition known as osteporosis. Fractures occur easily and in some instances tendinous attachments are ruptured. Deformities occur most frequently in the pelvic bones and the spine. The affected animal is greatly emaciated not only because her appetite is poor, but also for the reason that calcium plays an important part in metabolism. The articular cartilages lose their substance, joints become enlarged and rattling sounds are heard when the animal moves.

Symptoms. In cattle the first noticeable manifestation is usually in the form of a digestive disturbance with depravity of the appetite. At first the animal tends to lick at the manger or the walls, later they may gnaw at them and preferably objects which contain lime, such as mortar. As the disease progresses they will chew at rotten wood, eat bones and apparently relish straw or roughage that has been soiled with urine and feces. Their appetite for their regular diet remains good for a time, the depravity being noticed only between meals, but as the disease advances it becomes capricious they eat reluctantly and smaller amounts. Ultimately they may refuse good fodder entirely and the digestive disturbance is marked. Other prodromal symptoms are convulsions in which the animal appears dazed and staggers.

During this time changes in the bones have been occurring as a result of resorption of their calcium. The bone disease gives them pain, they lie down a great deal, are reluctant about rising and do not move except when forced to. Their movements are stiff and lameness may be quite marked much like rheumatism. When walking a peculiar cracking sound is heard at the joints probably due to the loosening of the articular cartilages. The bones seem sensitive to manipulation and quite often inflammatory swellings take place around their epiphyses. Fractures occur easily with deformities resulting.

The emaciation of the animal gradually increases. The muscles become flabby and ultimately paralysis may occur so that the animal is no longer able to rise. As a rule the temperature remains normal unless some complication occurs which gives rise to fever. The secretion of milk steadily decreases and finally ceases.

Osteomalacia always takes a chronic course and in the initial stages may pass unobserved. In some instances a change in the diet may arrest its development. Gestation, parturition and lactation are predisposing factors and aggravate or hasten the occurrence of the disease.

Treatment. If the condition has not advanced too far a measure of success may be obtained by the institution of proper treatment. On the other hand, if the animal is greatly emaciated, reluctant about moving and manifesting other symptoms of bone envolvment treatment is not so likely to be attended with success. If the disease makes its appearance while the animal is on pasture, it is advisable to change the pasturage and if possible supply leguminous forage for it is rich in calcium, phosphorus, protein and chlorides. If new pasturage is not available the diet may be augmented by supplying a grain ration containing cotton seed meal, bran, oat chop, and pos-

sibly barley chop. To this may be added a mixture of steamed bone meal 2 parts, and salt 1 part. Prepared chalk may be given, also phosphoric acid. Calcium phosphate is useful. In those cases where the appetite is poor digestive tonics and ferments are indicated and should be used. If cows are milking when affected it is advisable to dry them up. Other agents recommended are calcium chlorate and preparations of iron and phosphorus together.

Preventative measures consist chiefly of maintaining a suitable and properly balanced ration. The addition of calcium and phosphorus to the feed is useful. Bone meal, wood ashes, prepared chalk may be used for this purpose regularly and are comparatively inexpensive.

THE WIFE'S VICISSITUDES IN A VETERINARY PRACTICE

You veterinarians who think your trials and tribulations are many, should put yourself in the wife's place, just for a day. Then, indeed would your troubles begin! An average day starts in this manner. Friend husband is obliged to go very early to the country and I think, "What a nice long day for my home; now surely I shall catch up with the neglected left-overs of yesterday." I have my grocery order nearly complete when "ting" goes the telephone.

"Hello, no, the Doctor isn't here just now but will be soon."

"Well, that's all right, Mrs. Baker, tell him to come out to my place when he gets back. He knows where it is, he was out here last week, Wednesday, I think. That grey mule isn't doing just right." And he hangs up the receiver. Now in our county I imagine there are several grey mules, even though the tractor has sent many of them to the cotton fields of Texas. So next I search through the day book for the business of the previous week. To my great joy I find only three mule calls. Then to the phone book—Bill Andrews has no phone. Then I call Pete Smith. "No, he hasn't called Doctor Baker since last Monday." "All right, thanks."

By this time my husband returns and he completes the Sherlock Holmes stunt, locates the grey mule's owner and proceeds on his way.

To my horror, I discover that it is now too late to order the roast I had planned for the noonday meal. I must rack my brain to change the menu for the day. During this pleasant process, the phone again rings and Mrs. Pittman informs me breathlessly, "that her pure bred (she calls it thoroughbred) Toggenberg goat didn't give any milk this morning, and she is dreadfully worried. Won't I send the Doctor down immediately? It would break her heart to lose that goat: Junior has gained two pounds the last month on the goat milk regimen." And so on with the effusion.

The door bell rings and excusing myself, I hurry to the door. There stand two ragged little colored boys, almost white with terror, as they exhibit the limp body of a little fox terrier that some careless motorist failed to see. Even I can tell at once that nothing but sympathy can help. I console the boys as best I can and tell them where perhaps they can get another puppy almost like it. I had just remembered Betty Morrison's remark at last week's meeting of the Mothers' Club. "She just wouldn't bother with two puppies any longer" and asked Doc (by me) to administer ether to the black and tan one. I had forgotten that too until this moment. So I flew to the phone and found that the unwanted puppy was still there, "Sure the boys can have it and welcome." Two homes are happy again.

Back to the menu again. The phone rings as usual. My husband's voice, "Want anything from town?" "Yes, get some breakfast bacon. We shall have bacon and eggs this noon. And don't forget to go see Mrs. Pittman's goat. They live at 315 West First Street."

And now comes a lull in the day's activities. I rush around and finish up

the morning work. "Will I ever get time to paint the flower boxes," I wonder?

No time for day dreams because here comes the bacon. In no time, I can arrange a little luncheon and I must hurry as it is time for Elizabeth Ann to come home from kindergarten. Where has the morning gone?

But dainty pineapple salad, brown bread, sizzling bacon and fresh eggs are my chief concern just now.

Russell, our boy, comes home from school with his report card. Such a poor grade in art! We must do some homework these evenings, I promise myself.

And now the phone! Mrs. Riggs wants to speak to me—"Will I go with her to her bridge club this afternoon?" One of the richest women in town and not to be turned down with impunity, so I promise sweetly and in an undertone to my husband I say, "Bet that fat pup is sick again." She is always sponging free information about the care of that dog.

Bacon and eggs are cold by this time but we talk about the fine wheat weather Kansas is blessed with this spring, interspersed now and then with sprightly school gossip, touched up freely with the newest in slang, from our son, just past seven.

No calls after lunch and friend husband dries the dishes and leaves for the drug store. Suddenly I remember to call Freda to stay with Elizabeth Ann this afternoon. What a convenience phones are at times! "Yes, Freda is free this afternoon and will come gladly but she must bring her cat along as Fluff is acting rather queer." "All right, I say, bring along the whole cat family if you want to, but be here by two o'clock." In the meantime I plan to advise her to keep the cat on the back porch, as I have a particular abhorrence for cats in my house.

Elizabeth Ann is asleep and I am ready as Mrs. Rigg's blatant honk sounds. As I turn the door knob, the phone rings and I must go back to tell Frank Snyder that he can catch Doc at the corner drug store.

Seated luxuriously beside Mrs. Riggs the tale begins; "Oh, my dear, what do you suppose ails Ace (the dog)? He would scarcely touch his chops this noon and would not drink a drop of milk this morning." How nice it would be, if some poor child could have half the food and attention that pup has, I think to myself but aloud I say, "Isn't that strange?" The conversation goes on and on about Ace until I am desperate. "Why not give him a dose of ipecac this evening? It is harmless I know, because I've given it to the children." Mrs. Riggs decides to try the ipecac and thanks me for the information. The afternoon goes by, the topics between bids generally about dogs and diets.

Home again, to be greeted with the startling news that Freda's cat is a rabies suspect and is safely penned up for observation. "No, Elizabeth Ann has been asleep the whole time and hasn't even seen the sat," which is much to be glad about as she must fondle every cat she sees. Doctor is south of the river and will be late getting home, so the children and I dine gleefully on bread and milk. We whisk away the left-overs, get out the watercolors, crayons and proceed to practice on the painting necessary to bring up that low grade in art. This is fun and the day seems peaceful and quiet at the close.

That phone again. This is Bert Jones talking, "I want Doc to find out when that T.B. test is due again." All right, Mr. Jones, he will tell you in a minute. (I just heard the garage door bang.) The "Docteur du cheval" as they called him in France, comes in and the information is given.

We talk of the movies but decide home looks better. So we all go to bed early but not to sleep. The phone rings. This time it is some information about diets for turkeys. Perhaps the phone rings again once or twice but I have done my daily dozen and am not answering it myself again. I am—asleep.

Hazel (Mrs. E. C.) Baker.
Larned, Kansas.

Poisonous Plants of British Columbia

By L. H. PAMMEL, Iowa State College, Ames, Ia.

Timber Milk Vetch

I HAVE before me a most interesting bulletin by Dr. E. A. Bruce, Animal Pathologist, Health of Animals Branch, Department of Agriculture, Agassiz, B. C., on Astragalus campestris and Other Stock Poisoning Plants of British Columbia. This is a splendid contribution, splendidly illustrated and gives us some very definite experiments on poisoning of what is known as the "timber milk vetch."

"*Astragalus campestris* Gray (The 'timber' milk vetch). A disease is caused by the ingestion of the 'timber' milk vetch which differs entirely from that produced by any of the other known toxic species of Astragalus, or the closely related genus Oxytropis, in which genera the plants responsible for locoism are found. This disease does not resemble locoism at all, but in some respects suggests lathyrism.

"The affection is characterized by incoordination, difficult respiration accompanied by wheezing, whistling or roaring, and loss of voice in cattle and sheep, in which animals it is commonest in lactating females. Horses also are affected, the most prominent symptom being roaring of an expiratory type. Although indigenous to British Columbia the disease does not appear to have a common name: it is variously referred to as — timber trouble, timber grass poisoning, jack pine fever, husky, Kamloops cattle disease, knocking disease, timber paralysis, and roaring disease, these names applying to cattle and sheep. In horses it is known as—mountain fever, roaring disease, Clinton horse disease, and timber paralysis. We prefer the terms timber paralysis and roaring disease."

It will be remembered that this plant is related to the loco weed of our western states. The timber milk vetch is one of the most conspicuous plants on the range of British Columbia and grows to the height of eight to sixteen inches and in rounded tufts.

"It is a pretty, fragile vetch, with fine grass-like stems, small narrow leaflets, and little, scanty, pea-like pinkish-mauve blossoms, which grow comparatively far apart in long slender racemes. The colour of the flowers varies however, considerably, some specimens being almost white and others bluish; the majority, however, are pinkish-mauve.

Rather an interesting comment is made by Doctor Bruce that cases of poisoning correspond with the period in which the plant is apparently suitable for food. This may begin in the lower altitudes in May and at higher altitudes in June, July and August.

Apparently the plant is inocuous after it is dry. In conclusion the article states:

1. *Astragalus campestris* Gray is added to the list of poisonous plants.
2. For descriptive purposes in British Columbia we suggest that the plant be called "the timber milk Vetch."
3. Its habitat is the arid transition zone which lies between 1,600 and 4,200 feet approximately.
4. It causes heavy losses in horses, cattle, and sheep.
5. In cattle and sheep lactating females are especially susceptible, but dry females and males may be affected.
6. Poisoning takes place from the end of May until the latter part of August; most cases occur in June and July.
7. It affects the nervous system.
8. The disease produced is new to science, and it is suggested that it be called "pseudo-lathyrism."
9. Of its many local names that of "timber paralysis" is favored, with "roaring disease" as second choice.
10. Symptoms may develop in less

than a week after being exposed to the plant.

11. Two types of the disease occur, one characterized by incoordination, the other by difficult respiration: in many cases they are combined.

12. In cattle and sheep the disease is characterized by loss of voice, lack of leg control, and roaring.

13. In horses by roaring (bilateral laryngeal paralysis, also in cattle and sheep), alarming attacks of difficult respiration, that occur upon the slightest exertion, and in the early stages incoordination.

14. Sudden death from heart failure often follows excitement or exertion, the inhibitory power of the vagus being lost (paroxysmal tachycardia).

15. Recovery may take place, but chronic cases last for months; emaciation and pneumonia are common sequels.

16. The use of nux vomica has proved beneficial.

17. Both types of the disease have been produced experimentally in sheep.

Lupines

The paper by Doctor Bruce also contains some interesting statements concerning other poisonous plants: "The lupines, sometimes known as blue peas, blue beans, horse beans, etc., are widely distributed in the province, and twenty-one species are recorded of which at least four are reputed to be poisonous (*L. sericeus, L. leucophyllus, L. argenteus* and its variety *argophyllus*. The lupines are not easily differentiated even by one who has a little botanical knowledge, and for the purposes of this paper will be treated as one plant."

"Notwithstanding their number and their wide distribution, they are not of much importance as poisonous plants in this province. While other species of animals may be affected, the majority of cases occur in sheep: our records would indicate that an occasional horse is affected and sometimes sheep.

"As with a number of other plants it is the hungry animal that is poisoned. Cases rarely occur in a band of sheep if they are well fed. The following extract from a letter can be used to illustrate how poisoning occurs: 'Yearly, when I take the flock to summer pasture I lose one or more by lupine....after the first day, however, they seem to eat it abundantly and show no ill effects.' The point here is, that unless the band is held and allowed to fill up, they come upon the lupines, hungry, which being more easily reached than the grasses are eaten in even greater quantity over a short space of time, than occurs later. Poisoning does not occur except when a certain amount is eaten more or less at one time, because the poison does not accumulate in the system but is quickly passed off, chiefly with the urine. This fact explains why sheep regularly pastured in lupine country can eat over the course of a day far more of the plant than would poison them than if taken in, say, one hour. In taking sheep across a lupine patch it is much safer to let them drift across than to drive them. The time that lupine are most dangerous is when they are in pod. Marsh has shown that the seeds are especially poisonous, and that it requires approximately only one and a half pounds of the fully developed pods with seed to kill a 100-pound sheep.

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The Umbelliferae

"Under the Umbelliferae we have to consider the poison-parsnip or water-hemlock, of which there are at least two kinds in the province, the common one on the coast being *Cicuta Douglasii* and that of the interior *C. occidentalis*. The main difference between the two is in the rootstock. Both are equally dangerous and are considered the most violently toxic of all plants growing in the province. As the common name water-hemlock would imply the plant grows in wet places, and in such places other umbelliferous plants grow which may be confused with it. The plant that seems to be the most often mistaken for water-hemlock is the water-parsley (*Oenanthe sarmentosa*) which grows abundantly in

wet grounds near the coast. Another water loving plant that may be confused is the water-parsnip (*Sium cicutaefolium*). Angelica may also be mistaken for cicuta but it does not grow in such wet ground; on one occasion we fed three pounds of *A. genuflexa* to a calf with no ill results, thus confirming the generally accepted opinion that it is harmless. *Oenanthe sarmentosa* has never caused trouble. *Sium cicutaefolium* is reported by some writers as being poisonous, but so far as I can find, only on circumstantial evidence. To settle the point in so far as the plants growing in British Columbia were concerned, the writer watched nine cattle (four cows, three two-year-old, two yearlings) turned into a field and overnight found that they had eaten 138 plants without ill effects. Further a calf was fed in two days 19 pounds of the plant in flower including the roots, and a sheep was fed 6 pounds, without either animal showing any symptoms whatever."

"Two other poisonous umbelliferous plants remain to be mentioned—*Conium maculatum* and *Berula erecta.* The first mentioned is the poison hemlock, an erect, smooth, branching plant, from 2 to 6 feet high, with spotted stems, and large decompound leaves, which occurs only in the vicinity of Victoria where it is not likely to trouble live stock. This plant, famous from ancient days as extremely poisonous, has a disagreeable odor and is seldom eaten by stock; it had a mousey smell especially noticeable when the plant is bruised. It is said to have caused poisoning in the human in several ways. The seeds have been mistaken for aniseed, the leaves for parsley, and the roots for parsnips; also from blowing whistles made from the hollow stems. *Berula erecta,* the creeping cut-leafed water-parsnip whose range is given by Henry's Flora as streams and ponds, Kamloops; Okanagan Valley, and eastward, was upon one occasion held responsible for trouble in cattle at Popkum, which is in the lower Fraser Valley and entirely outside of the range mentioned."

Some valuable suggestions are made in regard to the treatment: "In some cases death takes place in less than an hour and consequently the first indication of trouble is often the finding of a dead animal. In early cases usually the first symptom seen is frothing at the mouth, followed by uneasiness and pain. This is succeeded by violent intermittent convulsions, in which the animal kicks, sometimes extending the legs rigidly, throwing the head backwards, bellowing and groaning as if in intense pain. Spasmodic contractions of the diaphragm occur as if the animal were trying to vomit. The pupils are dilated and the eyes sometimes turned in or down. In fatal cases the convulsions become more violent until ended in death.

"No effective remedy is known and in severe cases the convulsions are so violent it is impossible to give anything by the mouth. Cases sometimes occur in human beings, the roots being mistaken for parsnips, artichokes or horse-radish, and in such cases if an emetic is given promptly so that the stomach is emptied quickly, recovery usually takes place. Because of the fact that cattle cannot empty the stomach by vomiting, this treatment cannot be applied to them. Chloral hydrate, opium and morphin have been used to control the convulsions, and large quantities of melted lard, linseed oil and milk have been given. Occasionally an animal recovers but when it does, it is probably because the amount of poison taken was very small and not because of any treatment it received."

Of the 22 primary outbreaks of hog cholera in Maryland during March, 15 were due to infected pork in garbage, table scraps, kitchen swill, etc. 5 were due to the purchase of infected hogs. One was a "break" following vaccination and one was due to unburied carcasses which were left by a departing tenant. The one secondary outbreak was due to permitting hogs to run at large and come in contact with sick hogs.—I. K. Atherton.

Problems in Poultry Practice*

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WE Americans consume on an average 0.6 of an egg per day. Since there are about 115,000,000 of us and there are three hundred and sixty-five days in the year, our annual consumption amounts to 25,000,000,000 eggs. Stated in this way, it becomes less difficult to grasp that, through poultry and poultry products, the farmer and poultryman derive an annual gross income of over one billion dollars. Thus, the national income from poultry and poultry products is as great as that from cotton and slightly greater than that from wheat, each of which are around the $1,000,000,000 mark. The national income from poultry and poultry products is over twice as great as that from oats, or from potatoes, is greater than the incomes from barley, rye, buckwheat, sweet potatoes, and rice all taken together. It is outranked alone by corn, dairy products, and pork products.

The poultry industry, thus tremendous in volume, can prosper only as the favorable influences are fostered and the unfavorable are suppressed. Among the influences unfavorable to the poultry industry, poultry diseases rank high in importance. The gradual attrition of sporadic and enzootic diseases decreases profits; while unchecked epizootic diseases tend to work widespread havoc and ruin. Thus, a field of concerted interest appears in which the veterinarian may become an ally to the poultryman.

The question, "Does the poultry industry need the co-operation of veterinary practitioners?" may be answered in the negative by saying that the poultry industry has been developed thus far without any general dependence on the practicing veterinarian and that the veterinarian and veterinary curricula have taken notice of poultry practice as a field of activity and only recently—since the industry has attained its present size. The question may also be answered by saying that the poultryman needs the veterinary practitioner whenever the service he brings can not be more economically obtained in some other manner and the cost of his work is more than counterbalanced by the good he does or when further development of the industry promotes common welfare and is dependent upon his participation.

The term, "poultry practice," implies a veterinary practice in which a considerable volume of the business of the practitioner is for veterinary service in the poultry flock. Probably within this meaning of the term very few poultry practices can be said to exist in this section of the country today. That poultry practices may, however, be developed is attested by the fact that last summer the program of the annual meeting of the "Minnesota Veterinary Association" carried on its front page an illustration of a cock bird and a chick with this subscript: "Poultry practice constitutes an important item in the veterinarian's business." Doubtless, in Minnesota also many veterinarians do not find that service to flocks of fowls plays any important part in their activities. This may be caused partly by choice on the one hand, but on the other may also be due to the fact that some veterinarians have not found the means of building up a poultry practice. Again it may be recalled that but a decade ago little attention was paid to poultry and poultry diseases by veterinary practitioners or colleges and practically all development there has occurred has appeared since that time. Thus, it appears that headway is being made in developing this field of veterinary service.

The obstacles which prevent the more general development of poultry practices necessarily are of interest. The principal obstacles probably are: the low economic

value of the individual bird and of many flocks as a whole; the many free sources of information on the diseases of fowls; the lack of preparedness for poultry diseases on the part of many veterinarians, however skillful they may be in the management of ailments of large animals; and the lack of effective, certain, and economical means of controlling many diseases of poultry.

We can not alter the fact that the individual hen is not worth as much as a horse or a cow, and that often the entire flock has so little economic value that the owner frequently is deterred from calling in paid service when disease appears among his fowls. While we may lend some encouragement to certain individual poultrymen to increase the size of their flocks, and to keep better bred fowls, it probably will not be found in any large measure to be feasible thus directly to increase our opportunities for veterinary activity. Thus, we may leave the low unit value of fowls as a deterrent to a poultry practice aside as beyond our immediate control.

It will probably be granted that a still more serious obstacle to the development of poultry practices is the myriad sources of free information on poultry diseases. The Government, the various states, and a number of poultry feed manufacturers publish bulletins on the diseases of fowls and the widely read farm press as well as local newspapers constantly carry to the farmer and poultryman information in the form of articles of advertisements in the same field. These various contacts undoubtedly lead many poultrymen to feel that they have access to as expert a guidance as may be found, without recourse to calling the veterinarian.

Reference will again be made to the several free sources of information on poultry disease when the question will be raised regarding whether the farmer or poultryman benefits from them in a manner so that he does not require expert veterinary advice. Here, however, let us attempt to answer the question: would it be good policy to curtail or attempt to curtail the sources of information on poultry diseases which reach the layman? Rather than to array multitudinous arguments on the question let us examine one —one which carries sufficient weight to be conclusive.

This country is dedicated to the principle of educating the masses. There never was an era in the life of man in which the education of the common people was as axiomatic as it is today. There is not another nation on the globe which has devoted itself to the diffusion of education through the masses equally to this country. Magnificent grade and high schools, well endowed colleges, and splendidly maintained and supported state universities and experiment stations are the earmarks of this country and are to it what the temples of Athens were to the philosophic Greeks, the arena of the coliseum was to the warring and pleasure-loving Romans, or what the castle and cathedral were to the Europeans of the middle ages.

Education, then, is the spirit of the times. It has been a boon to us. It has also brought us problems. It has placed before many information which they were not prepared to use for their own good or for the good of others. Thinking they knew, and knowing but the half, many have come to grief in trying to be their own investment brokers, architects, ceramic engineers, physicians or veterinarians. Yet, no one would be willing to throttle, for a moment, our bent for education nor that freedom of speech or of the press which is one of education's greatest agencies; for the benefits have far outweighed the injuries, and time but proves the wisdom of our policy. Moreover, those who would oppose this trend in education in any special field will find themselves accused of a selfish purpose and unless well fortified probably will find their efforts worse than futile.

The lack of preparedness of some veterinarians in the field of poultry diseases can not be discussed intelligently without a joint consideration of the lack of effectiveness and the economic wastefulnes

of some of our control measures. For it is hardly to the point to say that the veterinarian who has not given study to the diseases of poultry needs merely to acquaint himself with what is available in text books and in the literature. Who can agree with the author of a well known text book on poultry diseases, who in the preface says: "The fourth edition has been thoroughly revised and brought down to the minute, and is the last word in poultry pathology?" Who can attempt to predict when the "last word" on poultry diseases may be spoken? And what woeful gaps in our knowledge must there not remain in all future times if indeed the last word has already been spoken in this treatise which is offered for use "as a text book in colleges and a reference book (for) veterinarians, students and poultrymen alike *all over the world*"? The truth is that we still are very much at sea in rationally trying to handle many types of poultry disease. The truth is that much of the information which reaches the poultryman especially by way of the "free" agencies if it is not actually misinformation is at any rate misleading because no way has yet been found to so condense the organized knowledge of any science that "the man who runs may read," and comprehend. It requires the prolonged application of the student to assimilate the knowledge and the viewpoint which are necessary to fully comprehend any disease and to emphasize or subordinate corrective factors —in other words to use discrimination according to circumstance in the attempts at treatment.

In poultry pathology we have too many diseases in which we at present are obliged to direct, "Kill and burn all diseased birds. Remove sick birds from the flock daily. Clean up and disinfect the premises." These are the measures herein branded as economically wasteful; they are justified today in our lack of a better mode of attack but should give way to better measures unless "the last word" in poultry pathology has indeed already been spoken. The veterinarian is compelled to use these control measures, which are also advocated by those who dispense free information. Thus the lack of more effective and economical means of disease control in the hands of the veterinarian constitutes an obstacle to his becoming active in his community in poultry practice.

A peculiarity in recognized treatments of poultry diseases is the widespread use of disinfectants, antiseptics, and antiferments in the drinking water as a means of overcoming alimentary disorders or in preventing the spread of disease. Twenty-five years from now this probably will appear just as irrational as if we had treated catarrhal enteritis of the horse or tried to prevent the spread of equine influenza with a bucketful of potassium permanganate water three times per day. Antiseptics in food or water when judiciously used may have some value. When used for excessive periods or in excessive concentrations they have been shown to be deliterious. Surely their use frequently tends to focus the attention of the poultryman upon this means of attack when sanitary and hygienic measures may be far more desirable. It may require some skill and tact for a veterinarian to lead a poultryman to appreciate the sanitary phases of his problem. Insofar as a veterinarian succeeds in so doing he is overcoming an obstacle to his participation in the poultry interests of his community.

Poultry biologics have not made a definite place for the veterinarian as a poultry practitioner. Fowl cholera bacterins and aggressins, and typhoid, roup, and mixed infection bacterins, have been exploited; the results following their use have failed to arouse great enthusiasm. Failures of some of these products may undoubtedly be in the use of a biologic unsuited to the case as in faulty diagnosis, or in the use of a biologic on fowls of such low vitality because of other ailments that proper response in antibody production remained wanting. Other failures undoubtedly have been due to a lack of antigenic value of the biologic itself. The new method of vaccination for fowl pox

and roup diphtheria introduced by Drs. De Blieck and Van Heelsbergen of Holland or those used by Drs. Black or Johnson of this country, however, promise to be of signal value as prophylactics. Here the condition of the fowl at the time of vaccination is already known to be of extreme importance in determining the severity of the vaccination reactions, which in some flocks approach the disastrous, and the degree of resistance conferred. The veterinarian should be the abler judge to determine whether any given flock is in condition to withstand or benefit by vaccination and be a leader in this field.

Poultry biologics may, and they should be used, but used with no promise of certain specified standards of results. In the course of years a true measure of their worth may be had. Yet, in the meantime the poultry practitioner must face the unfavorable effect of the fact that certain and definite results can not be forecasted when poultry biologics are used.

Lastly, there are new diseases or new aspects of old diseases that come to our attention and we are for a time without any means of combatting them. To this class belongs at present poultry paralysis. Here we meet with a disease of rapidly increasing economic importance distributed especially throughout the eastern states and heavily invading the south. It is caused by tapeworms, roundworms, cecal worms, coccidia, lack of vitamins, heredity, nutritional disturbance, lack of minerals, or a filterable virus according to the authority of your preference. It causes progressive blindness or lameness, emaciation and practically 100 per cent mortality. Recommendations again say: Destroy, burn, disinfect. And Kaupp states: "A flock or premises once having paralysis birds upon it will always cause paralysis even when a new flock of birds is placed upon the ground or in the building. The disease may appear on new ground or on ground where birds have been reared for many years. Treatment is impossible. A new flock on new land and new buildings is advisable." Surely, inability to meet the problems of poultry practice economically constitutes a bar to the entrance of the veterinarian to this field.

In the present more or less chaotic condition of poultry pathology, why should the veterinarian give any attention to the poultry disease problems of his community? And how may he with propriety gain entrance to this field of work?

In answer, we must first recall that the veterinarian is a professional man. A professional man is one who has acquired a technical training and who in the exercise thereof obtains some legal or social recognition. Common ethics places some restrictions and enforces some duties on members of a profession. Even as we consider it morally reprehensible for an older boy to cheat a younger lad at marbles or for an older boy not to go without idea of reward to the rescue of younger children in danger, the professional man is bound by social duty because of his superior knowledge not to take advantage of the laity and in a reasonable degree to lend his services to his community aside from expectation of pay. The professional man must, of course, earn a livelihood; thus, there is a limitation to which he may offer his services without expectation of reward and justification arises for charging pay for his services. Collecting a fee must not, however,, become the dominating motive and exclude regard for the social aspects of the veterinarian's duty.

Applying these concepts directly to the veterinarian and relating them in specific to poultry practice, we see clearly that the veterinarian must be very guarded in applying many of the means of treatment of poultry diseases which are now available; and he must not demand a return for his services greater than the value they may have bestowed; he may even be impelled to make no charge for services which have not benefitted his client.

Secondly, as he is bound by the duty of furthering the interests of his community, he can not stand by when diseases of a class of farm animals such as poultry are an important local problem on the plea that there is no money in it. The superior knowledge and judgment of the veterinarian should en-

able him more intelligently to apply the best of our knowledge on poultry diseases; he has a general preparation for this work—the principles of pathogenic bacteriology, pathology, sanitation, therapeutics, etc., which he has mastered in relation to the larger farm animals apply equally to poultry; and he owes the application of this knowledge to the problems of his community. The resultant "poultry practice" may commence purely as a free service and may in some localities never go beyond this. In other communities it may in fact develop into an important part of the veterinarian's business. In either case the veterinarian who thus conscientiously develops a poultry practice will be building good will which will aid his general practice, he will be aiding the general standing of the veterinary profession by virtue of unselfish service and he will be an asset to and a recognized builder of his community.

Avian typhoid is widespread in the United States. The principal symptoms of typhoid are high temperature, paleness of comb and wattles, and sulphur colored fecal discharges. The mortality rate varies from 25 per cent to 100 per cent. The disease can be controlled by sanitation and vaccination.

Inbreeding in poultry has not been given much consideration by the majority of poultrymen. According to L. C. Dunn, close breeding (brother and sister) in several lines for three generations resulted in a general decline in egg production and hatchability, an increase in the animals yearly for the past ten years or mortality rate and a decrease in the rate of growth.

Poultrymen in this country exemplified the financial genius of the American by the use of artificial light to increase winter egg production. Artificial lighting thus far has had little influence in the annual egg production of a given bird or flock, but by this means the winter egg production (the period of high price eggs) can be increased from 20 per cent to 50 per cent.

LOSS OF HENS DUE TO IMPROPER DIET

A short time ago I was called to see a flock of chickens that was dying from some cause or other. This was a mixed flock of the large breeds that had been fed all winter on nothing but corn and oats. The bowels were quite loose and passages varying in color from dark green to bright yellow. Comb was normal in appearance, egg production greatly decreased. Two to three hens were dying daily.

A postmortem examination of two hens showed identical conditions. A large amount of abdominal fat. Intestines and internal organs well covered with adipose tissue. Liver normal in size, but very friable and dark green in color. The bile in the gall bladder was thick and viscid. No other unusual condition was noted except in the region of the ovaries there was a thin yellow fluid which resembled a broken premature egg.

I looked over my Kaupp's Poultry Diseases very carefully, but found no solution of the trouble. Could you enlighten me on the subject and if possible suggest treatment?—E. B. M., Illinois.

Reply: From history, symptoms, and lesions I think your trouble due to too much carbonaceous food. I would suggest that this flock receive a mash similar to the following fed in hoppers kept constantly before them.

Wheat bran	30 pounds
Wheat shorts	30 pounds
Corn meal	30 pounds
Commercial beef scraps	10 pounds

Scratch grain should also be fed and should be fed in a deep litter to induce exercise. Fresh green food should be given in unlimited quantities. Grit, oystershell and charcoal should be kept constantly before them. Buttermilk would be an excellent supplemental food. I would also suggest that a laboratory examination be made to eliminate the possibility of an infectious disease.—F. D. Patterson, Jr.

UNFAIR COMPETITION FOR VETERINARIANS

I have practiced veterinary medicine for more than a third of a century and since we first had them, in counties that had a farm demonstration agent. Until I came to Mobile County, Alabama, I always got along very nicely with the county agent, but when I came to this county, I found things quite different. What hog vaccination was being done, was done free to the farmer by the farm agent. In the first three years that I was here, I had not a single call to vaccinate hogs.

At this time I was surprised one morning to have a farmer call me to inoculate some hogs. There were about 80 in the lot. I informed him that the farm agent had been doing all that work and I had no serum on hand, but could get it in twenty-four hours. We agreed on the price, and I ordered it and did the work. He then said that his last lot of hogs he had vaccinated himself and nearly all had died, although he had vaccinated them just as he had been taught by the farm agent.

I had no more calls to vaccinate hogs for a year, when a farmer asked me to order 1,000cc of serum for him, which I did, but the said farmer never has shown up to this day and I learned afterwards that he and the farm agent did the work, and all it cost him was the price of the serum, consequently the serum I ordered set on my shelf until out dated, and I lost it.

This was my experience in hog practice in this county until December, 1926, when hog cholera serum got so scarce and hard to get that Mr. Farm Agent could not get it, and they began to call on me again, and as I had paid for the serum I had lost by being outdated, my credit was still good with the firm. I began to do more vaccinating than I had ever done since coming to the Sunny South and began to keep a stock of serum on hand. However, the work shut square off as some one had sold the farm agent serum again, consequently I was left with a small stock of serum on my hands that was outdated before I had a chance to use it.

I don't care if I never vaccinate another hog as I would not give my small animal practice from a monetary point of view, for all the hog vaccination work; but that is not the point I wish to convey, which is, will the time ever come when the layman cannot buy hog cholera serum and virus, and many other drugs from commercial houses that are supposed to sell to veterinarians only? Until such a time comes, a practitioner's job will not be a bed of roses.

It is not only in the case of hog cholera serum, but of many drugs of a poisonous nature that should be in the hands only of the graduate veterinarian or M. D. I believe such drugs as aspirin, arsenic, strichnin and carbon tetrachlorid should be prescribed only by the graduate veterinarian or the M. D. Anyone can go to almost any drug store and get most of these dangerous drugs, particularly carbon tetrachlorid.

I was amused a few weeks ago when I was reading a circular of a party exploiting his capsules of carbon tetrachlorid, wherein he said the systematic dosing with carbon tetrachlorid will clean your place of worms as they are passed dead and the source of eggs stopped. As I see it, there is no difference in fords, why should these particular capsules of carbon tetrachlorid do more than others, but probably he knows.

One of Bill Nye's aphorisms was "Better not know so much as know so many things what ain't so," and my advice to the young man contemplating taking up the veterinary profession unless he expects upon receiving his degree to go into a city and take up small animal practice, to let it alone until such a time as the rural practitioner has more protection or more recognition than he has at the present time.

Mobile, Ala. G. W. Browning, V.S.

FUR RANCHING INCREASES VETERINARY PRACTICE

Statistics show there are over fifteen million dollars invested in the fox industry. A report from the United States market bureau shows that the annual fur business in all furs amounts to over five hundred million dollars. During 1927 there were forty-five thousand silver fox pelts sold at the various fur auctions. The largest buyer for the year is located in London he sold over nine thousand skins which were readily absorbed by English and continental buyers.

These figures have been quoted here to merely show the magnitude of the fur industry and to indicate the possibilities of the fox industry. Ranches are being established in the middle west very rapidly and it behooves the veterinarian, whose duty it is to protect our live stock industry, to familiarize himself with these animals. Some of the more unscrupulous fox breeders will lead the prospective buyer to believe that foxes are immune from disease. This is not the case, they have diseases and a lot of them. So important is the protection of the fox industry from disease, that the department of agriculture of the federal government is spending thousands of dollars every year for fox research.

First, the ranch should be located on soil that has a good drainage and if possible a sandy or gravel subsoil. It is obvious that the pens must drain well lest you will have damp ground for the animals to run on, which would mean unhealthy condition, and a good breeding ground for germs and parasite eggs. If the ground is not naturally sandy it is a good plan to put a layer of sand over the surface, thus making it easier to keep clean and also affording a good absorbent. The pens should be about twelve to fourteen feet wide by forty-eight to sixty feet long. The fencing should be set at least three feet under ground or the entire bottom of the pen carpeted with fencing material. The top should be entirely covered with net fencing or a two foot projection to prevent the foxes from climbing out. I wished to emphasize construction to establish sanitation, because on this alone hinges much of the prevention of fox disease.

The diseases of foxes can be classified under three headings, namely; Infectious, parasitic, and disease from incorrect feeding. In considering infectious diseases the most important and common is canine distemper. Foxes have this disease together with all of its complications just the same as dogs. Dr. J. A. Allen, Pathologist in the Canadian Department of Agriculture, says, "Assume that a sick fox, showing the least indication, is affected with distemper." It is a good practice to keep young dogs off of ranches —lest they become infected with distemper thus starting an outbreak among the foxes.

Young foxes of course are the most susceptible and anything which tends to lower their resistance is a predisposing cause of the disease. Chief among these causes are: Intestinal parasites, low damp pens, poor drainage and improper feeding.

Considering parasitic diseases we find that the fox is host to coccidia, round worms, hookworms, tape worms, lung worms, sarcoptic mites, ear mites, lice and fleas.

A parasitic disease that deserves special mention is the ear mite. Not only because it mats the hair around the head, thus causing an inferior pelt, but the tip of the tail also becomes infested (due to the animal laying in a position with the tip of the tail near the ears). The animal knaws and nibbles the tail thus removing the white tip that the furriers value so highly.

The conditions that are caused by incorrect feeding are, rickets, intestinal troubles, poisonings, and big head. The latter condition being caused by decaying meat or germs gathered by the pup dragging the meat over the ground. It is most common in pups that are teething.

Topeka, Kans. Chas. W. Bower.

ALLOTRIOPHAGIA ASSOCIATED WITH TAENIASIS IN THE BITCH

The case was that of an English Setter which had just weaned a litter of pups and had been put to use regularly in the field. It was noticed that she had two spots of eczema, one located over the nose, about the size of a half dollar, the other, a little larger in the region of the saddle. The spot on the nose yielded to treatment and disappeared, the other, however, remained. Scrapings were taken from it and proved negative to mange mites. It eventually disappeared after about a month of treatment.

About six months later the owner noticed that the mammary glands were swollen. As the animal had just been in estrum this was supposed to be a false lactation due to this condition. The lesions persisted however, and one day the bitch was found sucking her mammary glands. She was watched closely thereafter and it was found that she did this frequently when left alone. During this time she was anemic and lost flesh rapidly. The condition appeared to be of metabolic character, suggesting a lack of vitamins or calcium deficiency.

The dog was given a mixture of Calcium Lacto-Phosphate and Elixir of Digestive Comp. The owner was advised to feed her some cow's milk and to give her plenty of bones to chew on, but this treatment proved of no benefit. Small daily doses of arsenic were then tried, but this also failed. An attempt was then made to stop the animal from self-sucking by painting the mammary glands with a solution of aloes, but this did not have the desired effect.

A little later the owner reported having noticed a small worm on a stool passed by the dog. Our conclusion, that this was a segment of a tapeworm, was confirmed by finding tapeworm eggs in feces on microscopic examination. After a fast of about ten hours, one-fourth of a grain or arcolin hydrobromid was given per os, twenty minutes later there was passed a large mass of tapeworms sufficient to fill a 250 c.c. container. These were of two species, Dipylidium caninum and Taenia pisiformis.

Following the expulsion of these worms, the bitch discontinued sucking itself, and her mammary glands ceased functioning at once. She regained her vitality rapidly, and now appears to be in very good health.

Conclusions: When conditions exhibited by this bitch are encountered involving the cutaneous lesions, the depraved habit of sucking her mammary glands, true allotriophagia or depraved appetite, taeniasis should suggest itself.—H. B. Steinbach, *Veterinary Extension Quarterly, No. 27, University of Pennsylvania.*

CONVULSIONS IN DOGS

This term is commonly given to more or less general muscular contractions occurring simultaneously and successively for a variable time, constituting a fit of some kind. It is also, however, applied at times to certain more localized contractions and in the majority of cases, is termed a spasm.

The cases of convulsions are ofttimes more than usually complex, constituting a line of conditions partly made up of predisposing exciting causes. It is often the fashion to pick out some one of the most prominent or easily recognizable of these factors and speak of it as the cause of the attack. It must never be forgotten that this so-called cause in any given case may be able to account as such only when in conjunction with certain more obscure conditions.

The cause of convulsions resolves itself into a strictly clinical question. It is one thing for the veterinarian to ascertain what are the particular individual states and conditions of life and occurrences, physical or otherwise, which have contributed to induce an attack of convulsions. It is quite a different problem when the veterinarian tries to unravel the actual mode of production of the convulsions which concerns us less than the clinical side.

One of the most important of the predisposing causes is the existence of an un-

duly excitable nervous system, one in which there is a tendency to produce reflex movements. This state is much more marked in high-bred dogs than in the common cur. There seems to be a lack of proper balance between the functional activities of some of its parts and there seems to be an undue tendency to errors of nutrition whereby the nervous system becomes from time to time highly unstable, and undergoes impulses of a morbid character. It may be inherited, the patient from birth may have possessed a nervousness of this type due to a low vitality, which is often seen in puppies born from weak and debilitated parents. At other times, the nervous system may have acquired such predisposing characters some time during life, especially during puppyhood owing to various conditions, such as the cachexia which follows distemper, improper or insufficient food, chronic diarrhea or worms.

Convulsions are classified as functional or organic. Those functional forms are produced without pathology to the central nervous system and are either peripheral or toxic in origin, while those of the organic type are both central and pathological.

Functional convulsions due to peripheral reflex may be a result of gastro-intestinal disturbance, fat explosions, protein curds, sugar intoxication, unmasticated foods in the stomach, coarse products of indigestion, teething, round worms, otitis media, a foreign body in the ear, rickets, malnutrition and a sphasmophilic diathesis.

Convulsions due to toxicity may be induced by both exogenous and endogenous substances. Of the first are included drugs and chemicals which are characteristic of their various physiological actions.

Convulsions due to endogenous substances may be a result of uremia or asphyxia of the new born or very young puppy, or toxemia due to acute infectious diseases and hyperpyrexia of distemper, influenza, and dysentery with cerebral congestion, or due to gastrointestinal intoxication, dilation of the intestines, stasis, calcium metabolism or a fault of the paratyphoid glands which is known as tetany or spasmophilia.

If a puppy that has been previously well develops repeated convulsions with fever and drowsiness, we think of meningitis, while in a patient that is apparently healthy and without fever, we think of tetany, rickets, or fright disease.

Organic Convulsions: Under this type of convulsion, there is a greater complexity of brain and nerve involvement and symptoms than those of the functional form. In organic convulsions there is a change of normal brain structure, which either retards brain development or destroys some portion of its normal function. This form of convulsion may be the result of various predisposing and exciting causes, which are as follows; under the exciting cause we have trauma, brain pressures and bacterial infection.

AGRICULTURE 25 Jun 28 LIBRARY

Trauma to the head: Under this sub topic, it is safe to say that every veterinarian that has had a few years of practical experience can recall cases of both functional and organic convulsions due to head injuries of puppies.

It should be remembered that head or brain injuries may remain both delayed and latent and that focal symptoms are not always an early evidence of such injuries. Possibly the greatest source of trauma to the head of the puppy is at the time of birth. Abnormal and pathological presentations, delayed or prolonged deliveries and compression of the head either through the pelvic outlet or by instrumental operative procedure are responsible for the abnormal molding of the head and trauma to the brain that may render the pup subject to convulsions in after life.

Treatment: The use of narcotics and drugs of a sedative nature are of no permanent benefit in these cases. They simply allay the excitement; they do not reach the cause of the disease, and as long as that remains the return of violent symptoms is inevitable and each recurrent attack leaves the patient weaker and more debilitated than it was before. The only hope then of a successful treatment is to locate the cause and set to work to remove it. If organic or due to a trauma to the brain, the prog-

nosis is usually unfavorable. However, trephining or the use of such other surgical measures as are called for, may stop the convulsions.

In the so-called fright disease, it will be found that 90% of the trouble is reflex or functional, either caused from constipation, undigested proteins, starches and an all too sloppy diet, especially of sweet milk, potatoes and grits, which form a culture medium for the propagation of intestinal parasites. The only hope, therefore, lies in cleaning up the worm-infested focal infections and the bacterial residue that is creating the toxins which are poisoning the system.

This cannot be done at once. To entirely rid the patient of worms, eggs that produce them and the mucus that they thrive in, takes more than one treatment; in fact, two or three weeks. This being the case, we should avoid the use of too poisonous a drug for anthelmintic purposes, for what benefit is it to us if we give a highly toxic drug even if it gets 100 per cent of worms, when we know in two weeks the larva that is emigrating through the system will reinfest the patient, which has not yet gotten over the shock of his last worming, and is left in a weakened condition each time. Therefore, it is more logical to give a treatment that possesses other medicinal properties besides being a vermifuge, and in all cases a worm treatment, whatever is one's favorite drug, it should invariably be accompanied by a cathartic, not in four hours or two hours, but given at the same time the anthelmintic is given. Even santonin works much better and is less harmful to the patient if a 1/20 gr. podophyllin tablet is given at the same time, and it leaves the intestinal tract much freer of acid mucus than if santonin is given alone.

In those cases of convulsions where we have meningitis, there may not be much wrong with the digestive organs, and needs a different treatment for these conditions, as I have repeated before in previous writings, hypericum is the most indicated drug, and I have got so I never allow myself to be without it, and in closing wish to call the small animal practitioner's attention to the fact that there are so many latent causes for convulsions in dogs and other small animals that he should use every possible means that is at his command to arrive at the true cause and remove it. This is expected of us by our clients, and we should so inform ourselves on these conditions as to render our clients the good service to which they are entitled. G. W. Browning.

Mobile, Alabama.

CEREBRAL SYMPTOMS IN SWINE DUE TO SALT POISONING

Referring to the inquiry on page 179 of the April issue of VETERINARY MEDICINE, where H. B. H. of Missouri reports the loss of three hogs during the past six weeks with the following symptoms: temperature 107 deg. F., excessive ptyalism, very nervous, throwing head to one side, start to walk forward, suddenly stop and back up, etc.

The above symptoms are a very good description of an excessive amount of salt. The lesions found in the stomach are further evidence of salt poisoning.

I know that some think that salt fed to hogs in large amount is not injurious; but my experience has been different.

Dr. Kinsley was on the right track when suggesting inspection of the feed.—H. A. P., Missouri.

BAKER TELLS THE FARMERS

E. T. Baker, Moscow, Idaho, a frequent contributor to these pages and nationally known as an authority on sheep diseases, is the author of an excellent article in the April issue of the Idaho Farmer. The article discusses principally sheep husbandry, in the entertaining style of Dr. Baker, but occasionally dips into veterinary matters.

For example: "The dosage of medicine given a sheep is about four times that taken by an adult person. For a lamb, about the same amount given to a high school freshman is correct. . . . Don't try to drench a sheep, or you will be sorry. Mix the drug with thick molasses and smear it on the back teeth or tongue. . . . Exercise is an

absolute necessity. Pen up a bunch of pregnant ewes during stormy or rainy weather and a lot of trouble ensues. Paralysis, blind staggers, slinking dead lambs, and blood poison follows. Then add a nice mess of foot rot, wool pulling, blue bag, and the owner will wish he had never heard of sheep.

. . . Diarrhea or scours in lambs is quickly fatal. The little fellow has such a small resistance to disease that he usually dies getting well. . . . Add a thin dime's worth of theory to 90c worth of experience, and you have a pretty well balanced combination."

INCO-ORDINATION DUE TO LIGHT ATTACKS OF MILK FEVER

Referring to the inquiry of W. F. H. on page 181 of the April issue of Veterinary Medicine, wherein he describes a five-year-old Jersey cow suffering from difficulty in eating roughage and in drinking: On several occasions I have seen similar cases especially in the Island breeds of cattle and on each occasion, I diagnosed the case as partial parturient paralysis.

For treatment, I inflate the udder; administer 1/10 grain lobelin sulphate t.i.d.; massage the spine; administer intestinal antiseptics; refrain from completely emptying the udder of milk for three to four weeks.

On three occasions, I have seen similar attacks of difficult eating and drinking previous to freshening and treated the subjects with strychnin 1/8 grain, t.i.d.; massaged the spine and ice packs to the head. After calving, these patients were guarded against milk fever; each one however, displayed some difficult walking symptoms, which I thought had been produced from internal nerve pressure, since you probably agree that many of the Island's Jerseys are weak across the back bone, probably lacking mineral properties.

Just last July, I treated a Guernsey that displayed symptoms similar to the ones you describe. One veterinarian had prescribed electric spinal massage or ultra-violet medication, the other suggested iron, quinin and strychnin. Being in the immediate vicinity conducting a tuberculin test, I suggested to the herdsman that we treat her as a milk fever patient and in less than two hours that cow had consumed more water and hay than at any time since freshening, which was 21 days previously.

During 1915, I had another case displaying symptoms similar to those you describe, but the patient happened to be a feed lot steer that made frequent efforts to drink and consume hay and salivated profusely. For a time, I thought of rabies, foot and mouth disease, etc. I advised destruction and we found a nail lodged in the base of the tongue.

Foreign bodies as DeVine suggests, can produce alarming symptoms, at another time I saw a large Guernsey bull crash into a heap after a convulsion, that acted like strychnin poisoning. These spasms came about when this bull was used for service. No symptoms of traumatic pericarditis were present. At the expiration of three weeks, he was found dead one morning and on postmortem examination, we found a wire that had punctured the heart.

I wish to state that of these cases in cows, I described, that all of them showed a desire to eat and drink, but for some unknown reason could only with difficulty and each one I have observed salivated profusely and champed the jaws similar to equine lockjaw cases, but on treatment for milk fever each one responded nicely to the treatment. I wish, likewise to say that each animal was able to get up and lie down unassisted.

Peru, N. Y. F. E. Boyd.

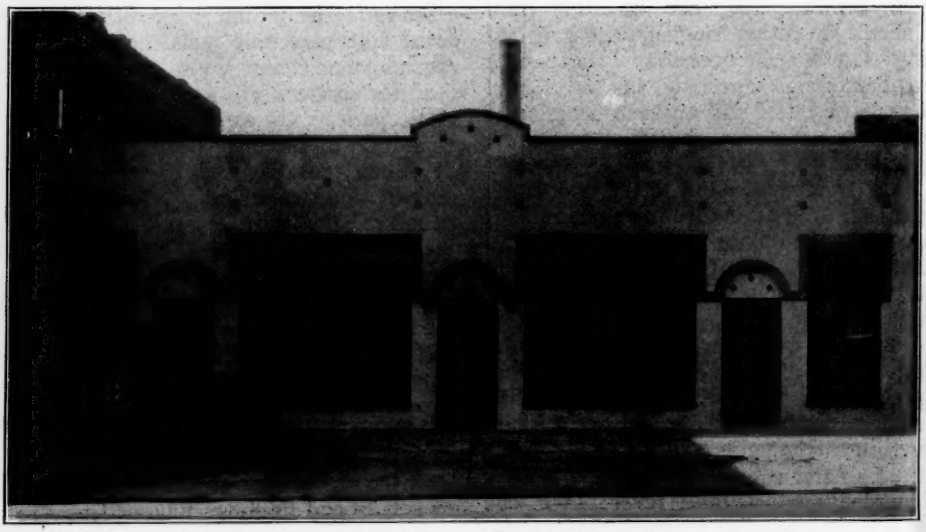
Most sheep breeders expect an average annual loss of from 5 to 10%. The greatest loss of ewes and lambs occurs at lambing time. The losses of ewes and lambs at lambing can be almost eliminated by proper feeding and care of the ewe for two to three weeks prior to lambing and for a like period after lambing.

CARE OF PREGNANT EWE

In the care of the pregnant ewe there are three features most essential. The diet provided should be of a wholesome character, nutritious and sufficiently varied to provide all of the elements necessary for the maintenance of her health and the development of the fetus. For this purpose a light grain ration composed of oats, bran, and a little flax seed meal is suitable. For roughage, alfalfa or clover hay together with coarser food may be used. Roots are also of value. A half a teaspoonful of the iodin of potassium for each sheep once a month during pregnancy is used to prevent goitre in the lambs. Salt should be available at all times. Exercise is a very important item in the care of the pregnant ewe. It is essential to their physical well being. The ewe should be allowed out every day. It is not only essential for her but also assists in the development of a strong, thrifty and robust lamb, and the ewe is less likely to have trouble at the lambing time. Nearing the time of parturition the ewes should be fed smaller amounts and on food of a more laxative character. Pens should be kept clean, comfortable and warm when lambing occurs.—R. A. McIntosh, in Report of the Ontario Veterinary College.

AN EASY METHOD OF BURNING CARCASSES OF HOGS

It is not advisable to bury the carcasses of animals that have died of infectious disease. I know that on some farms the question of



Dr. L. E. Casey, of Dallas, Texas, recently completed his new hospital located at 2221 Cedar Springs Road, and which he calls the Blue Cross Veterinary Hospital. It is in a very good location, just a short distance from the business section and on one of the main traffic ways leading to the downtown section. It contains 50 individual cages, built in sections of three and six. The sections of three have two cages 24x30x24 above, and one large cage 48x30x36 below. They are built of heavy angle iron with heavy wire welded in place, and have removable wood floors. Each section is placed on heavy six-inch ball-bearing castors that make it easy to move. The cages are of Doctor Casey's own design and were built by a local welding company. He finds them very satisfactory. The contagious ward is in the rear of the main ward. The building also contains a feed room, bath room, kitchen and attendant's bed room. There are 12 individual outdoor runs in the rear of the building, 5x20, and a large open yard. Doctor Casey uses these a great deal, as he believes plenty of sunshine is very beneficial to convalescing patients.

fuel is important, but if you dig a trench, say eighteen inches wide, two feet to two and one-half feet in length and eighteen inches in depth, and lay across this little trench a few pieces of scrap iron that you might readily find on most farms where they have some of their old machinery, and put the fuel underneath, it takes very little fuel to completely burn the carcass of a hog dead of cholera.

This is a comparatively easy method of incinerating the entire carcass quickly without a great deal of smoulder and smut about the place. I always advise against the burying of these animals for the simple reason that the owner or the tenant might be of a lazy disposition and not dig the trench deep enough, and hogs might pasture or roam around the place where these bodies have been buried, even a year or so afterwards, and dig up some of these carcasses, which would still be virulent and might produce hog cholera.

Peoria, Ill. A. T. Peters.

B. Abortus Bang Organisms are eliminated from the vagina of cows for a period of two weeks after having been injected with live culture vaccine, according to Buchli. This evidence is not of much value because of the limited number of cases observed.—*Trop. Med.*

Two cases of carcinoma developed in mice as a result of a single application of hot tar. In these experiments the temperature of the tar was 70 deg. C. (158 deg. F.) The cancer-producing substance appears to be present in the higher-boiling fractions. The exact nature of the cancer-producing substance has not been determined. It would appear from this that carcinoma should be relatively prevalent in the workers that are more or less constantly in contact with coal tar and it would be interesting to have a detailed record of the cause of death or at least the occurrence of carcinoma in such operators.—*Bact. Abst.* Vol 9, No. 8.

THE BOSTON TERRIER

The Boston Terrier, by Vincent G. Perry, International Show Judge, published by the Judy Publishing Company, Chicago; 153 pages, profusely illustrated; cloth bound; price $2.00.

Earlier volumes devoted to this popular native breed are not lacking, but one must welcome this recent addition to the literature on the Boston terrier, by an author combining an expert knowledge of the breed with an unusual ability as a writer.

The "Boston Terrier" follows the conventional arrangement, dealing with the origin and history of the breed, the foundation and leading strains, breeding, feeding and care, with much emphasis on all that has to do with showing the dog.

The standard for the breed is, of course, given, together with several chapters interpreting the standard. Miscellaneous discussions include directions for advertising, photographing and thum nail sketches of recent winners, including those in the shows of February 1928.

Most veterinarians devoting any particular attention to small animal practice deem it necessary to have books on the various breeds of dogs about their offices for the diversion, entertainment or instruction of their clients, and this is one that will fit into such a collection.

It deals but sketchily with veterinary subjects, and sanely except in a few instances, as the following quotations show: "Instruments mean death for the pups and death for the bitch nine times out of ten. The Caesarean operation has brought more good dogs into the world than would be imagined. If done in time and by competent hands, it is not as hard on the female as hours of labor; and she raises her puppies and recovers to have more. Some bitches have had as many as five operations and raised five litters of puppies. Cases have been known and not infrequently of bitches that have had as many as three Caesarean operations whelping their litter later without artificial aid."

On cropping, the author says: "His ears should not be cropped until he is at least

six months old, and then only by some one who thoroughly understands Boston terriers and surgery as well. Under no consideration should a dog be cropped unless he is put under a complete anesthetic."

A short chapter is given on the sick dog. The author states that he does not feel himself equipped to discuss remedies. Had he stopped there, it would have been a better book; but at that, the chapter contains less of what has been termed "Information that ain't so" than any similar book the writer recalls.

For example, it is stated dogmatically that some dogs are naturally immune to distemper; that there is no sure cure for this disease and no real preventive; and it gives this further advice that some veterinarians will not agree with, and others will applaud: "There is one rule though that applies to almost every ailment of the dog. Keep him at home. Avoid the dog hospital." Later the statement is qualified by confining it to the pet dog. The dog that all his life is kept at his owner's knee.

An astonishing statement considering the character of the book, is the following: "A handful of dry table salt forced down a dog's throat will rid him of a great deal of poison in his system and sometimes effect a quick recovery if done soon enough." The statement refers to the treatment of distemper, and in view of the care observed in the preparation of many parts of the text, it seems unbelievable that the author would include such a recommendation, a treatment that, of course, he nor no one else has seen given and which no dog well or sick could survive.

The book is one of Judy's "Blue and Gold Library," which means that it is beautifully printed and bound. It is regrettable that owing to faulty proof reading it contains errors in spelling.

Pulmonary strongylosis in swine can, according to Nisset, be successfully treated by the chloroform method provided the treatment is given before extensive pneumonic lesions have developed. (*Exp. Sta. Rec.* Vol. 58, No. 1.)

TRAINING THE POLICE DOG

Training the Police Dog, by Fred Kollet, fifth revised edition, published by the Judy Publishing Company, Chicago; 57 pages, well illustrated, bound in art paper; price $1.00.

Compared with the price at which veterinary texts are sold, the cost of this book seems high for one so small, but the fact that it has reached the fifth edition in four years, indicates that it is worth the price.

Every veterinarian who has German shepherd owners among his clients, is asked concerning the training of the police dog. This book by a recognized authority on the subject, is the answer. The instructions are not limited to training the dog for police work, but includes the whole field of useful training.

TRANSMISSION OF CRYPTORCHIDISM IN ANGORA GOATS

The occurrence of cryptorchidism in horses and swine and the transmission of this defect is common knowledge. Recent investigations indicate that cryptorchidism is a relatively common defect in Angora goats. Thus, it has been found that about 5% of male kids sired by normal bucks are cryptorchids. The percentage of cryptorchids is not materially increased when a cryptorchid buck is used until about the fifth year, when the percentage of cryptorchids increases to about 25% and is increased to 40% in the sixth year. From the fact that 5% of the male kids are cryptorchids from a normal buck it is possible that cryptorchidism occurred in some of the foundation breeding stock and it is probable that it will require careful selection over a considerable period of time to eliminate this defect.

Bacterin treatment for infectious abortion was administered to 785 head of cattle on 29 farms and 55 cattle on 7 farms were treated with the live culture or vaccine. The reports are encouraging on this method of controlling abortion disease. (Ky. Stat. Report, 1926).

Reviews and Abstracts

Tannic Acid a Superior Application for Burns[1]

The American surgeon, E. C. Davidson is responsible for the treatment of burns with tannic acid.

Numerous works have been directed toward an explanation of the fatal ending of extensive burns occurring from the eighth day to the third week after the burns. The suppression of skin functions, blood changes, are only secondary elements in the clinical picture whose evolution is predominated by the absorption of toxic substances around the burn and the theory of toxemia seems to be admitted as true.

Some details upon the pathogenicity of such happenings are interesting. Vogt and Vaccarezza have practiced parabiosis between two animals, one of which presented an extensive burn.

Both animals showed general toxic symptoms; if the animal not burned was separated from the burned animal before the 12th hour, he presented no signs of intoxication; if not separated on the contrary, the two animals succumbed after a variable time.

Robertson and Boyd burned young rabbits with metallic plates, then, before the eighth hour, they made transplantations of skin, attaching burned skin to healthy animals and, with the skin from the unburned animals grafting the burned animals. These transplantations, quickly made, were followed by signs of intoxication on the part of the unburned animals, while the burned animals on which the burned skin had been replaced by healthy skin showed no sign of intoxication. If the transplantation occurred after the eighth hour, all the animals presented generally grave symptoms.

Tannic acid on the surface of a burn produces coagulation and the rapid drying of the tissues, the toxic products are insolubilized and are no longer absorbed.

The Davidson treatment of burns is composed of two distinct parts, general and local. The general treatment is the same as that employed in all other treatments and tends to restore and especially to hydrate the patient by the usual means, the injections of artificial serums.

The local treatment has two phases: the first to prevent complications by coagulation and rapid drying of the devitalized tissues as far as forming a scab; a second phase is the excision of the scab and the treatment of the remaining wound.

Coagulation must be obtained as quickly as possible and for the drying a solution of tannic acid is applied every half-hour. The solution is a concentration varying from 0.75 per cent to 5 per cent until the burned area acquires the characteristic brown color. Even a very extensive burn may be completely coagulated in 16 hours, producing a surface, indurated, smooth, regular and completely insensitive. This absence of pain would alone justify the use of the tannic-acid treatment. The scab protects the wound from traumatisms and also from secondary infections. Until the protection of this impermeable covering a burn generally remains sterile throughout its entire evolution and, having coagulated no fever is evolved. Any sudden rise in temperature indicates a deep infection which should be sought out and treated.

In superficial burns which affect only the epidermis no treatment other than the tannic acid applications is required. Usually at the end of two weeks, the scab is eliminated from superficial burns uncovering a surface properly skinned-over. In these cases, one never removes the scab but awaits its natural exfoliation.

When the skin is totally destroyed, the scab adheres to the underlying tissues and slower reparation is made by the epidermic proliferation around the margin.

[1] The Treatment of Burns with Tannic Acid, by A. Floresco. Gazette des Hospitaux, Paris, Sept. 27, 1927. Abstracted by M. C. Brown.

In this case, surgical treatment is necessary to remove the scab, excision being made with scissors and bistouri. It may be necessary to treat before intervention with some kind of pomade. Excision of the scab is made about two weeks after the burn and the underlying tissue treated as an ordinary wound.

Infectious Abortion in Cattle

The Georgia Experiment Station[2] has been investigating contagious abortion in cattle for a period of over four years, primarily with a view to determining if the disease can be eradicated from a badly infected herd of dairy cattle without the expense of disposing of all of the reactors. They seem to have demonstrated that this can be done and that it is practical.

In 1924 plans were made for a series of experiments to study the possible curative properties of a number of chemical compounds. All of the compounds considered were blood stream disinfectants. Of the compounds tried acriflavine solutions gave the best results.

The presence of contagious abortion in the herds treated with this agent was demonstrated by the agglutination test, a peritoneal injection of milk from the cows into guinea pigs and the calving records of the cows. The blood from all the cows receiving intravenous injections of acriflavine solution gradually lost its agglutination power, and all such cows produced normal calves following a normal gestation period.

The use of acriflavine had no apparent bad effect on the cow except a loss in milk production for a few days.

Because of the small number of animals used for testing each agent, these results are not considered conclusive. The test will be repeated on a herd containing 75 cows infected with contagious abortion.

Infectious abortion is stated to be the most costly live stock disease and to be increasing in prevalence rapidly. It is believed that the loss from it now is in excess of $80,000,000 a year.

[2] Thirty-Ninth Annual Report of the Georgia Experiment Station, Experiment, Ga.

Infectious Abortion of Cattle

In a Bureau of Animal Industry Bulletin recently issued on this subject, Buck[3] gives a detailed discussion of the subject including the occurrence, nature, history, cause, symptoms, lesions, diagnosis, treatment and prevention. The discussion emphasized the wide distribution of the disease and its great economical importance, and the fact that while abortion is the best known symptom, sterility, weak calves, retained afterbirth and low milk production are important results and just as truly symptoms of the disease as is abortion.

The organisms commonly gain entrance through the alimentary canal being ingested with contaminated feed and drink, or obtained by licking affected animals.

There is little cause for believing that abortion losses can be reduced by the administration of drugs or medicinal compounds.

The bulletin says that the transmissibility of this disease was recognized by European investigators in 1876 and 1878. This statement is undoubtedly true, but it might lead the reader to infer that the communicability of this disease was first recognized but little more than 50 years ago. This is far from the case, as veterinary literature even 75 years earlier than the date mentioned contains numerous references to the communicability of abortion not only in cows, but in mares. The following from James White's Dictionary of the Veterinary Art, published in 1817, stated in this connection: "Slinking of one cow is apt from this circumstance to be communicated to others. It is proper,

[3] Contagious Abortion of Cattle, by John M. Buck, Associate Bacteriologist, Pathological Division, Bureau of Animal Industry; U. S. Department of Agriculture Farmers' Bulletin No. 1536.

therefore, to separate the cow from the rest of the herd.... A cow that has once slipped calf becomes more liable to the accident (occurrence) in the future.... Never suffer the cleanings or afterbirth to be taken into a pasture where pregnant cows are kept.... After abortion has taken place, the cow should be kept in a sheltered place by herself. If the afterbirth has not passed off, no force or medicine should be used to hasten its removal."

The foregoing was written more than 100 years ago, and 80 years before Prof. Bang discovered the abortion bacillus, yet as a sanitary code for the control of this disease, it cannot be improved upon very much at the present time.

The probabilities are, however, that the transmissibility of contagious abortion was understood much earlier than the beginning of the nineteenth century. In fact, as Doctor Buck has pointed out in a letter to the writer, there is reason to believe that Jacob (Genesis, Chap. 31, V. 38) was not only familiar with contagious abortion in cattle, but possessed considerable knowledge concerning its prevention.

The Ovary in Sterility

Marshall[4] points out that metritis following abortion is apt to bring about conditions in the ovary that persist after the original causes are removed and are, of themselves, sufficient to cause sterility. Most important of these he regards as persistent copora lutea and ovarian cysts. Of less importance is sclerosis of the ovary. The persistent yellow body and sclerosis of the ovary are prone to cause frigidity or sexual calm. The opposite condition, nymphomania, is likely to result from ovarian cysts.

The persistent yellow body in the ovarian cysts usually yield to treatment; that is, to expression and to rupture. Sclerosis is incurable.

[4] The Ovary in Sterility, by C. J. Marshall, presented September 12, 1927, at a meeting of the Society for the Study of Diseases of the Genital Organs of Domestic Animals, and published in the Veterinary Extension Quarterly, No. 28, of the University of Pennsylvania.

The McClean County System of Swine Production

In this bulletin, Raffensperger[5] tells for the first time the whole story of the origin, development and results of the swine sanitation project carried out by himself and others in the Zoological Division of the Bureau of Animal Industry.

While a number of investigators whose work extended back over a period of nearly 30 years, are entitled to some measure of credit for their findings, it is apparent that the chief credit for this achievement lies with the late B. H. Ransom, who conceived the plan as a result of laboratory investigation, and H. B. Raffensperger, who carried out with rare skill and judgment the plan outlined by Ransom.

The discovery that ascaris eggs must develop for a period outside of the host, and at a lower temperature than that of the host, and that upon being ingested, the embryos leave the intestinal tract and pass the larval stage of their existence in the lungs of the pig, and that it is in this stage that the chief injury to the host occurs, is a matter of far reaching importance in both human and veterinary medicine.

The further discovery, and this was a purely incidental one, that proper sanitation in the rearing of pigs would not only prevent losses from ascarids, but reduce the loss from lung worms, bull nose, necrotic enteritis and other filth borne diseases is of an importance to the swine industry equal to that of the main project.

A summary of the work shows that the McLean County System reduces the loss of pigs 50%, enabling the swine raiser to market 76 out of 100 pigs farrowed, instead of 50 marketed under the usual conditions. This enables the owner to raise as many hogs with two brood sows as he formerly raised with three, and to save the cost of keeping 33 1/3% of his brood sows, but such is not the greatest

[5] The Swine Sanitation System as Developed by the Bureau of Animal Industry in McLean County, Illinois, by H. B. Raffensperger and J. W. Connelly, Zoological Division, Bureau of Animal Industry; U. S. Department of Agriculture Technical Bulletin No. 44.

gain from the McLean County System. Pigs raised under this system are ready for market seven weeks younger than those raised under the old system; and at market time weigh 28 pounds more per head than hogs raised under the old system.

Runts and backward or unthrifty pigs are largely eliminated in herds raised under the McLean County System. When the pig losses from accident, cholera and other causes not filth borne are excluded, the McLean County System was shown to be from 93% to 99% effective under actual farm conditions in preventing loss of pigs.

All veterinarians are now familiar with the McLean County System of swine production, so it is unnecessary to give the details of it here. Essentially it consists in the removal of the sow to a clean farrowing pen a few days before farrowing, and of taking the sow and pigs within a few days after farrowing from the farrowing pen to clean pasture, and not permitting the pigs to have access to ground on which older hogs have been kept until they are about four months of age.

At the time the sow is removed from the herd to the clean farrowing pen, she should be mechanically cleaned, brushed and washed with soap and water, to remove ascarid eggs that adhere to her coat. The use of disinfectants for the destruction of ascarid eggs is of no advantage nor is it advisable to administer anthelmintic treatment to the sow.

Bovine Tuberculosis

McNeil[6] has collected into a bulletin, which extends to 80 pages, all of the more important papers presented at the Eighth Annual Meeting of the Eastern States Tuberculosis Conference.

As the proceedings of this conference were reported in these pages by J. F. DeVine, it is unnecessary to review the bulletin at this time. This was the last tuberculosis conference but one or two that the late J. A. Kiernan attended. At it he presented a summary of ten years' work in eradicating tuberculosis, a discussion of historical interest. It is a bulletin that should be in the hands of every veterinarian, and we presume may be had for the asking.

[6] Bovine Tuberculosis: Progress in its Eradication, compiled by John H. McNeil, State Veterinarian, Trenton, N. J. New Jersey Department of Agriculture, Circular No. 131.

Treatment of Shipping Sickness in Horses with Hemorrhagic Septicemia Serum

A report of the treatment of 215 cases of shipping sickness in horses from a single sales stable, with hemorrhagic septicemia serum, is given by Marshall and Lee.[7] 115 of these cases were treated at the Veterinary School Hospital, and 100 of them were treated in the sales stable.

At the hospital, special attention was given to feeding, watering and ventilation, together with appropriate treatment in addition to the hemorrhagic septicemia serum. The cases treated at the sales stable received no special attention.

A summary of the cases treated at the hospital shows 90 cases of influenza with 3 deaths; 19 cases of pneumonia with 12 deaths, and 6 cases of purpura hemorrhagica with 4 deaths, a total of 19 deaths or 16.5%. The 100 cases treated at the sales stable were classified as follows: Influenza, 50 cases with one death; pneumonia, 48 cases with 17 deaths; purpura hemorrhagica, 2 cases with one death, a total of 19 deaths in 100 cases, or 19%.

The figures, however, are not strictly comparable since 13 of the 48 cases of pneumonia were probably moribund when treatment was commenced, and unable to walk to the hospital.

In commenting on the report, the authors say: "The writers have been familiar with sales stable conditions for years and have never known of a more satisfactory treatment than is shown in the report of these 100 cases."

[7] Final Report on the Treatment of Shipping Sickness in Horses with Hemorrhagic Septicemia Serum, by C. J. Marshall and W. J. Lee, School of Veterinary Medicine, University of Pennsylvania, Veterinary Extension Quarterly, No. 26.

Hemorrhagic Septicemia

McGilvray[8] discussing the subject of this bulletin, says: "Hemorrhagic septicemia of cattle is an acute or subacute infectious disease caused by the germ *Bacillus bovisepticus*. The disease is characterized in general by its sudden development, rapid course, and high mortality.

"As a rule, outbreaks of this disease occur very suddenly and without any warning, so that the first thing to attract attention is the fact that several cattle are noticed to be severely ill, either in the stable or at pasture, or in other words, an enzootic outbreak of disease has occurred on the premises. These outbreaks do not generally spread from farm to farm, but usually remain confined to the premises on which they occur. After a time the outbreak may subside on the affected premises as suddenly as it appeared."

The author states that the *bovisepticus* is widely distributed in nature and frequently found in the soil. Also that certain animals are believed to be "carriers;" that seasonal and other conditions may influence the organism to increase its virulence or lower the resistance of the animal and cause a sudden, and often inexplicable outbreak of the disease.

While all cattle are susceptible, the susceptibility of young cattle is greatest. Shipping appears to increase the susceptibility and infected stock cars and public yards through which they may pass, completes the preparation for an outbreak of the disease.

The symptoms vary according to the severity of the attack. Sudden illness, high temperature, gastro-enteritis, or pleuro-pneumonia, edematous swellings, infection of the mucous membranes, painful cough, discharge from the nose and eyes, labored breathing, bloody diarrhea, exhaustion with death in from one to three days, and up to ten days are common occurrences.

Differential diagnosis, treatment and prevention of the disease are discussed briefly in this bulletin.

[8] Hemorrhagic Septicemia of Cattle, by C. D. McGilvray, Special Bulletin, Ontario Department of Agriculture, Toronto, Ontario.

Hog Cholera

Roderick and Schalk[9] point out that while the serum simultaneous immunization for the prevention of hog cholera is effective, that it possess certain obvious and important disadvantages:

"It is quite apparent that the present method of immunization of swine against hog cholera is a cumbersome and expensive process. That it is an economic procedure is unquestioned. It is expensive in that the hog is necessary for the cultivation of the virus and the homologous host is the only suitable animal now available for the preparation of a potent protective serum. It is cumbersome because of the comparative volume of serum required for efficient immunization and because two separate biologic preparations—serum and virus—are necessary. Nevertheless, experimental evidence is accumulating to suggest that it may be impossible to simplify the present methods."

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It has been stated that the minimum fatal dose of hog cholera virus lay between 1/215 and 1/300 cc and experimental work was undertaken to verify this. In two experiments carried out with 14 pigs each, there was no difference shown in the virulence of cholera resulting from the injection of 2cc of virus in the control pig and in 1/10,000 of a cc in the test pigs. When 1/25,000 of a cc was used, only 2 out of 5 pigs developed typical acute cholera. Injections of 1/50,000 of a cc produced typical cholera in 2 pigs, a delayed attack in the third, and a fourth was unaffected. As higher dilutions were not tried, the minimum lethal dose of hog cholera virus is perhaps not yet determined. It seemed astonishing, however, that a 2 cc dose of virus ordinarily given in vaccinating hogs, is sufficient in amount properly distributed, to cause a fatal attack of cholera in 100,000 animals.

Some experiments were made in passing hog cholera virus through goats. The inoculation of goats with hog cholera virus and serial transfer through goats failed to develop virulence for the goat which re-

[9] Collected Studies on Hog Cholera, by L. M. Roderick and A. F. Schalk, Bulletin No. 210, North Dakota Agricultural Experiment Station, Fargo.

mained normal in all cases. The virus persisted in the goats for at least two passages and was able to cause fatal attacks of cholera in pigs.

An experiment was undertaken in the passage of virus through the peccary, a relative of the hog. Hog cholera virus is avirulent to the peccary and repeated passing it through that animal did not develop virulence for it. However, the virulence for hogs persisted to the fourth passage through the peccary, whereas it disappeared in the third passage through the goat.

The bulletin records some experiments into the longevity of virus, the keeping quality of serum and the properties of mixed serum and virus.

Organisms Occurring in Pasteurized Milk

This bulletin[10] is the eighth of a series on this subject. Others are mentioned elsewhere in these pages.

A study of 271 samples of milk from 13 dairies from the standpoint of average counts obtained, indicated that the holding temperature previous to pasteurization may have some, but not a decided effect upon the number of organisms resisting pasteurization.

A study of a series of pathogenic streptococci leads to the conclusion that pasteurization temperatures kill all strains having any pathological significance.

Few, if any hemolytus streptococci pathogenic for man can resist pasteurization or at least the frequency with which pathogenic streptococci escape destruction by pasteurization is small.

Streptococcus thermophilus is the predominating coccus, if not the most common organisms in pasteurized milk. In many instances, nearly a pure culture of this organism can be obtained from pasteurized milk. No diminution can be noted in its general activities, as a result of pasteurization. Other organisms found in pasteurized milk are *M. epidermidis, M. luteus, M. varians* and *Sarcina lutea.*

Some regard the survival of the *S. thermophilus* in pasteurized milk as desirable so that normal souring may occur at a relatively high temperature. Holding the milk for some hours, four or five, before pasteurizing at a temperature of about 30°C. (86°F.) insures a plentiful supply of *S. thermophilus* in the pasteurized milk. As before stated, no increase in pathogenic organisms in pasteurized milk is caused by such process since all such organisms are killed during pasteurization.

Cooling the milk immediately after it is drawn to 10°C (50°F.) or lower and holding it at this temperature until it is pasteurized, resulted in its containing very few *S. thermophilus* after pasteurization, but an increasing number of various strains of *micrococcus.* Such milk is prone to putrify with age rather than sour normally.

Trembles and Milk Sickness Due to Tremetol Poisoning

Among the many perils and hardships that marked the settlement of the old frontier of the United States was the mysterious malady known as "milk sickness." Appearing customarily late in the summer it rapidly assumed epidemic proportions, sparing neither age nor sex, frequently sweeping whole villages. Nearly every district in the old West—now the Central West—suffered at one time or another from this disease and so sudden was its onset, so recondite its cause, so unavailing were the preventive measures taken by the terrified backwoodsmen, and so fatal were the attacks, that the old chroniclers refer to it in the strongest terms as formidable, terrible and frightful.

Such is the introduction by Couch[11] to the record of his research which resulted in the discovery and isolation of the poisonous principle in *Eupatorium urticaefolium,* responsible for "trembles" in cattle, horses and sheep, and for "milk sickness" in man, or animals, consuming the milk of animals suffering from trembles, or eating butter or cheese made from the milk of affected animals.

[10] A Study of the Cocci Resisting Pasteurization Temperatures, by G. J. Hucker, Technical Bulletin No. 134, New York State Agricultural Experiment Station, Geneva.

[11] The Toxic Constituent of Richweed or White Snake root (Eupatorium Urticaefolium) by James Fitton Couch, Pathological Division, Bureau of Animal Industry, U. S. Dept. of Agric., Reprint from Journal of Agricultural Research, Washington, D. C., Vol. 35, No. 6.

For more than a hundred years the cause of milk sickness and of trembles has been sought, unsuccessfully. Although the true cause, the richweed was suspected, the difficulty of definitely incriminating it baffled investigators of this subject, until the present investigation after nine years continuous research added to what had been learned in preceding investigations, solved it.

Losses from *Eupatorium urticaefolium*, commonly known as richweed and white snakeroot and locally by many other names, occur from the Atlantic seaboard to the Mississippi River and as far south as the Carolinas. The losses were large among the early settlers but became much less frequent as the land was brought under cultivation. "Milk sick areas" always contain woodlands. The disease is unknown on the prairies.

As early as 1809 considerable information on milk sickness in man and trembles in animals was collected and published; and yet a hundred years later, Mosely published the result of an extended investigation in which, in the light of our present knowledge, erroneous conclusions were drawn.

The many investigations of milk sickness occurring during a period of more than a century constitute a striking illustration of the importance of extreme care, scientific accuracy and ample checking when any research work is undertaken. In early times it was commonly observed that milk sickness in man and trembles in animals occurred at the same time and in the same locality; that persons who did not use milk or butter escaped its ravages; that persons who discontinued the use of milk and milk products when first attacked recovered and that calves sucking cows affected with trembles and hogs to which such milk was fed in turn contracted the same disease. Yet, with all this accurate information the deaths from milk sickness among the early settlers continued to decimate whole communities; practically exterminating some settlements. This could hardly have been other than partly due to the mistaken conclusions drawn from early investigations, which repeatedly absolved the milk from blame.

The investigation produced much contradictory evidence and offered some unusually difficult problems for solution. Cattle will not eat white snakeroot except when other food is not available, so the presence of the weed even in profusion in cow pastures was frequently unaccompanied by any trouble from milk sickness. A similar disease occurs in New Mexico where white snakeroot does not grow, only recently was it proved that this is due to a poison in the rayless golden rod. The white snakeroot appears to vary in toxicity at different seasons of the year, and perhaps also in different localities and in different years. Tremetol, the poisonous property, was exceedingly difficult to isolate and to recognize and finally the plant contains another poison, toxic for laboratory animals, but unconnected with milk sickness and perhaps inocuous for cattle and sheep.

Couch has worked out a simple color test for the presence of tremetol. Petroleum ether in which tremetol is dissolved when poured onto sulphuric acid shows a cherry red ring at the puncture of the two liquids. For the detection of tremetol in the plant the test is somewhat complicated, but for milk it is simple. Merely shake up a few cc's of the suspected milk with an equal quantity of petroleum ether, allow to settle and decant the ether onto sulphuric acid. If no ring appears, the milk does not contain tremetol. Other substances than tremetol may show a ring when dissolved in ether and poured onto sulphuric acid, but a distinct cherry red coloration is strongly indicative of the presence of tremetol and ordinarily sufficient to condemn a sample of suspected milk.

But, one additional problem with regard to the poisonous properties of white snakeroot appears unsolved by Couch's investigation. He was unable to find tremetol in the dried plant and yet there are apparently authentic reports of livestock, particularly horses, showing typical symptoms of trembles, dying, and on autopsy, showing the usual lesions from eating the dried dead weeds when other forage was covered with snow.

Recent Bulletins of Interest to Veterinarians

Sheep and Goat Lice

Leaflet No. 13, U. S. Department of Agriculture. This bulletin gives the names and a description of the lice found on these animals, manner of spread, detection, methods of treatment, instructions for dipping and a description of the dips used.

Wild Tobaccos as Stock-poisoning Plants

Technical Bulletin No. 22, U. S. Department of Agriculture. It appears that two of the wild tobaccos, *Nicotiana Trigonophylla* and *N. attenuata*, are responsible for a considerable loss of live stock in the southwest. This bulletin gives a description of the plants with a number of illustrations, the range on which each is to be found, the conditions under which the plants are eaten by live stock, symptoms of poisoning, and an account of some feeding experiments.

Johne's Disease

Research Bulletin No. 81, Agricultural Experiment Station, University of Wisconsin, Madison. A discussion of this disease, which has been recognized in this country for twenty years, but has only recently attracted any considerable attention from veterinarians and stock owners. The occurrence, methods of spread, prevalence, losses occasioned, lesions, recognition and means of its control are discussed, with a full description of the use of the avian tuberculin test for cattle and the Johnin test. The latter is much preferred for the recognition of this disease.

Johne's Disease Infectious Diarrhea of Cattle

Bulletin No. 200, Louisiana Agricultural Experiment Station, Baton Rouge. A very brief discussion of the subject with illustrations showing the lesions.

Immunity or Resistance of the Chicken to Coccidial Infection

Bulletin No. 230, Oregon Agricultural College Experiment Station, Corvallis. The discussion of coccidial infection in chickens, including a record of a large number of experiments.

The Active Principles of the Posterior Lobe of the Pituitary Gland

Reprint of an article by Oliver Kamm, T. B. Aldrich, I. W. Grote, L. W. Rowe and E. P. Bugbee, in the Journal of the American Chemical Society, Vol. 50, No. 573, obtainable from the Research Laboratory of Parke, Davis & Company, Detroit. A highly technical discussion of the demonstration of the presence of two active principles in the pituitary gland, the separation of these principles and their concentration. The principles are to some degree antagonistic and the advantages of giving only the active principle indicated instead of the extract of the whole gland are detailed.

The Modified Accredited Area Plan

An unnumbered bulletin of the Pennsylvania Department of Agriculture, Bureau of Animal Industry, Harrisburg. Explicit directions are given for handling a herd after it has been tuberculin tested.

Bang Bacillus Disease, Prevention, Control and Eradication in Pennsylvania

Reprint of an article by T. E. Munce, published in the Journal of the American Veterinary Medical Association Vol. 24, No. 3. This gives the complete details of the "Pennsylvania Plan" for handling contagious abortion. This plan has been discussed at length in VETERINARY MEDICINE.

Pennsylvania Dog Law

An unnumbered bulletin published by the Pennsylvania Department of Agriculture, Bureau of Animal Industry, Harrisburg. The Pennsylvania dog law has recently been vigorously attacked by various kennel clubs and others interested in dogs. This bulletin is an attempt to show that the law is a wise one and benefits alike the dog owners, sheep owners, tax payers and everyone. An array of arguments are marshaled for legal control of the dog situation.

To Prevent the Spread of Hog Cholera in Pennsylvania

Regulation No. 524, Pennsylvania Department of Agriculture, Bureau of Animal Industry, Harrisburg. The regulation largely deals with swine shipped into the state and swine exhibited at public fairs. Under certain conditions, serum-virus vaccination is required, under others, serum alone and under still others, animals are admitted to the state and at fairs without immunization to hog cholera.

Comparative Values of Types of Anti-Hog Cholera Serum

Circular No. 11, U. S. Department of Agriculture. A discussion of the three types of anti-hog cholera serum, blood serum, clear unconcentrated serum and clear concentrated serum, with their relations as to protective value and cost. The discussion clearly favors the use of the clear concentrated serum.

Relation of White Snakeroot to Human Milk Sickness

Reprint of an article by Albert A. Hansen, published in the Journal of the Indiana State Medical Association, Vol. 20, May, 1927. A record of field investigations of poisoning in Indiana from milk of cattle suffering from the ingestion of white snakeroot, together with a number of feeding experiments and a historical discussion of deaths among Indiana pioneers from milk sickness.

Farm Horseshoeing

Farmers' Bulletin No. 1535, U. S. Department of Agriculture. In view of the increasing scarcity of the blacksmith-horseshoers, this bulletin has been prepared with a view to enabling the farmer to shoe his own horses. It contains numerous illustrations.

Rabies

Health Educational Circular No. 29, Illinois Department of Public Health, Springfield. A discussion of the occurrence, prevalence and prevention of rabies in dogs and man.

The Physiology of Milk Fever

Reprint of an article by P. A. Fish, from the Cornell Veterinarian. A variation in the sugar content of the blood either above or below normal has not been demonstrated as a causative factor in milk fever. It is more likely a secondary factor resulting from an interference with the processes of oxidation in the tissues. The factor responsible for the changed tissue conditions is still to be determined.

The Blood and Urine of the Cow in Milk Fever

Publication of the Department of Physiology and Bacteriology of the New York State Veterinary College, Ithaca, by C. E. Hayden and L. B. Sholl. So far from there being a hypoglycemia in milk fever, the conclusion of this investigation is that there is an actual hyperglycemia and a glycosuria in milk fever cases, from which one might reason that a glucose injection in animals suffering from milk fever is contraindicated.

That there is a hyperglycemia and a glycosuria in milk fever is further confirmed by a second article on the same subject by Doctor Hayden, and which may be obtained as a reprint from the N. Y. State Veterinary College.

Thermophilic and Thermoduric Micro-Organisms, with Special Reference to Species Isolated from Milk

Technical Bulletins No. 130 and No. 131, New York State Agricultural Experiment Station, Geneva. The first of these bulletins comprises mainly a review of the literature on the subject, but the following classification of the organisms is given. Strict thermophiles, those having optimum growth above 55 deg. C. (131 deg. F.) and failure to grow below 37 deg. C. (98.6 deg. F.) Thermoduric mesophiles, optimum growth between 20 and 37 deg. C. (between 68 and 98.6 deg. F.) but will survive in relatively large numbers in raw milk (at least 90 per cent survival) at temperatures as high as 62.8 deg. C. (144.7 deg. F.) for 30 minutes.

Circular No. 131 comprises a description of the non-spore forming thermoduric organisms isolated from milk.

The Blood Sugar of the Cow in Milk Fever

Reprint of an article by C. E. Hayden, in the Cornell Veterinarian. The investigation failed to demonstrate a hypoglycemia in milk fever.

Micrococci Present in the Normal Cow's Udder

Technical Bulletin No. 132, New York State Agricultural Experiment Station, Geneva. This is a discussion of a highly technical research into the flora of the cow's udder. The conclusions are the germ content of the normal cow's udder is higher than 500 per cc. Twelve species of micrococci were identified.

Nodular Lesions in the Spleen of Swine Caused by Actinomyces Infection

Reprint of an article by G. T. Creech, in the Journal of Agricultural Research, Washington, D. C., Vol. 35, No. 9. This is a discussion of nodular livers of swine simulating tuberculosis of the liver, but due to the ray fungus. A number of illustrations of photomicrographs are given.

Remarks on Some of the Diseases of Swine

An unnumbered bulletin from the State Department of Agriculture, Bureau of Animal Industry, Lincoln, reproducing a paper presented by Dr. L. Van Es before the 30th Annual Meeting of the Nebraska Veterinary Medical Association. A brief discussion of the more important diseases of swine with particular stress on the filth borne diseases. After enumerating the hazards of cholera and post-vaccination troubles, of filth borne diseases and pulmonary ailments and early farrowing, the author says: "Add to this the cold and wet of early spring, and possibly inadequate and injudicious feeding, and we must wonder, not at losses, but at the number of pigs which in spite of it all, manage to survive."

Feeding the Dairy Herd

Getting the Most From the Dairy Herd by Right Feeding, Bulletin No. 397, Agricultural Experiment Station, University of Wisconsin, Madison, Wis. This bulletin explains the method of determining the right amount of feed for each animal in the dairy to get the greatest net gain from the animal. Charts for working out this problem are given and the method of their use explained.

Poisonous Plants of Colorado

Drs. L. W. Durrell and George H. Glover, of the Colorado Experiment Station, have issued an interesting bulletin on the poisonous plants of Colorado, a pamphlet of 28 pages and numerous figures which describges in detail the more important poisonous plants of that state; giving a description of the plant, where the plant is found, when the plant appears, poisonous parts of the plant, poisonous periods, poisonous principles, animals affected, symptoms of poisoning, and remedial measures.

This splendid bulletin should be in the hands of every veterinary of Colorado and adjacent states, since it takes up a large number of the most important of the poisonous plants of that state. This publication will prove invaluable to the veterinary profession and stock growers of Colorado.—L. H. Pammel.

MATTERS OF CURRENT INTEREST

NEW VETERINARIANS

The 1928 graduates of the Veterinary Division of the Kansas State Agricultural College numbered 18. Their names and addresses are as follows:

Robert Stuart Bishop, Manhattan.
William Arthur Browne, Burdett.
Robert Ambrose Brunson, Corona, Cal.
Floyd Eugene Carroll, Manhattan.
Clait Jennings Doty, Manhattan.
Glen LeRoy Dunlap, Manhattan.
Daniel Peter Ehlers, Manhattan.
Robert Lovell Elsea, Manhattan.
George Dewey Huston, Manhattan.
Albert Ernest Lauts, Manhattan.
Roy Lewis McConnell, Manhattan.
John Norris McIlnay, Manhattan.
Theodore A. Newlin, Lewis.
Vilo Thoranton Rose, Ionia.
Albert Irving Schmidt, Kansas City.
John David Shoeman, Manhattan.
Louis H. Smith, Lebo.
Jack Harvey Spurlock, Burlingame.

Of these, 12, as follows, were commissioned second lieutenants in the Veterinary Reserve Corps:

Floyd Eugene Carrol, Glen Leroy Dunlap, Daniel Peter Ehlers, Robert Lovell Elsea, Albert Ernest Lauts, John Norris McIlnay, Theodore A. Newlin, Vilo Thoranton Rose, Albert Irving Schmidt, John David Shoeman, Louis Harrison Smith, and Jack Harvey Spurlock.

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The veterinary profession of Virginia has been aroused over the licensing of a non-graduate for practice in that state without an examination. The man in question is U. R. Drummond of Eastville. He is stated to have taken the state veterinary examination on three occasions, making an average of 3.2%, 15.2% and 15.3%. The average required being 65%, Drummond, of course, failed in all three examinations. Granting a certificate to practice without an examination is unlawful in Virginia, and the profession, led by Drs. H. T. Farmer and H. H. Rowe, have instituted legal proceedings to bring about the cancellation of his license to practice.

The Michigan Board of Veterinary Examiners has revoked the license of an "existing practitioner" in that state.

The Michigan Veterinary Practice Act authorizes the State Board of Veterinary Examiners to revoke the license of any veterinarian upon satisfactory proof of incompetence to practice, for the practice of fraud upon the public, or for claiming to be able to cure incurable diseases.

In this case, the veterinarian, a licensed non-graduate practitioner, advertised in a local paper that he could diagnose abortion disease in cattle by the use of a thermometer and was capable of curing the disease.

The next annual meeting of the Vermont Veterinary Medical Association will be held at Burlington, July 10 and 11, 1928. G. N. Welch, Sec.-Treas., Northfield, Vt.

One of the most attractive circulars that have come to our attention from any source is an illustrated folder from Dr. Moxley's Dog and Cat Hospital, 1036 North Highland Ave., Hollywood, Calif. Veterinarians contemplating advertising their practices will do well to write Doctor Moxley for a copy.

Doctors Wm. R. Ecker and Don A. Yandell announce, in a neatly prepared card, the opening of the Newark Dog and Cat Hospital at 787 Clinton Avenue, Newark, N. J. On the back of the card they give a number of "Hints on the Care of the Dog," which includes a recommendation that the dog be vaccinated for the prevention of rabies and for the prevention of distemper.

EASTMAN SMALL ANIMAL CLINIC

It was announced some months ago in these pages that Dr. D. A. Eastman of Cedar Rapids, Iowa, was building a new dog and cat hospital. The Cedar Rapids *Evening Gazette* of May 11th contains a full-page announcement of the opening of this hospital and an invitation to the public to attend a public reception and inspection.

Doctor Eastman calls his new establishment the Eastman Small Animal Clinic. The same paper in which the full-page announcement of its opening occurs contains a story about the clinic and an illustration of the building. The building is described as English cottage style. It contains ten rooms and is furnished with the latest equipment for small animal practice. The basement is equipped for bathing and clipping dogs, and contains a crematory.

Prior to the public opening, Doctor Eastman entertained 50 members of the veterinary association of Lynn and adjoining counties at his new hospital on the occasion of the recent meeting of that association in Cedar Rapids.

Doctor Eastman has long been a believer in newspaper publicity and such publicity has been no small factor in the unusual success he has attained in building up in the course of a few years what is undoubtedly the largest small animal practice in Iowa. We believe it is the first time that a veterinarian has used full-page space in a metropolitan newspaper for ethical, dignified advertising.

A booklet has been prepared showing views and giving a description of the hospital. Others contemplating advertising their facilities to the public will find many valuable suggestions in this booklet, copy of which can no doubt be obtained by applying to Doctor Eastman at 864 A. Ave., Cedar Rapids, Iowa.